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THE MEDICAL JOURNAL OF AUSTRALIA

VOL. II.—30TH YEAR. SYDNEY, SATURDAY, DECEMBER 18, 1943. No. 25.

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VESALIUS THE ANATOMIST.[1]

BY THE LATE L. COWLISHAW,
Sydney.

FOUR hundred years ago, in the month of June, 1543, the printer and publisher John Oporinus, of Basle, issued from his press the "*De Humani Corporis Fabrica*" of Andreas Vesalius. This book was destined, as Sir William Osler tells us, to be one of the greatest books of the world and to lay the foundations of modern medicine. In the twenty minutes at my disposal this afternoon I propose to tell once again the tragic life story of one who has been called "the Luther of anatomy".

The life of Andreas Vesalius was one of great accomplishment and success during the earlier years, which ended all too soon in tragedy. It is the story of a wonderful man: the years of preparation and striving after knowledge in Belgium and France; the years of achievement and fame in Italy followed by the years in Spain as the favourite physician of the Emperor Charles V, where the jealousy, corruption and intrigue of the court temporarily sapped the genius of the anatomist; the casting off of the shackles of a soft life in Madrid, the return to Italy and the pilgrimage to the Holy Land; the decision to return and once again to resume his life work in his adopted country Italy; and then the final phase, all these pious resolutions brought to nought by the shipwreck and lonely death on the Greek island of Zante.

A malign fate would appear to dog the anniversaries of Vesalius. In December, 1914, the University of Louvain in Belgium had arranged a celebration of the four hundredth anniversary of the birth of its most famous son. When December, 1914, came, the University of Louvain had been laid in ruins by the Hun invader and Belgium was occupied by the German hordes. This year, 1943, again finds Belgium in the hands of the Nazis, and the celebration of the four hundredth anniversary of the publication of the famous book of Vesalius is once again impossible in his native land. The minds of the countrymen of Vesalius are full of other thoughts. To quote (in translation) the words of a Belgian poet:

> The beauteous land of Flanders,
> The joyous country of Brabant,
> Are sad as the cities of the dead;
> Where in olden times, in the days of liberty,
> Songs were heard and the sound of music,
> Silence and death now hold sway.

Andreas Vesalius was born on the last day of December in the year 1514. The family name was properly Wesalius and came from the town of Wessel. Three weasels are to be seen on the family coat of arms. The immediate ancestors of Vesalius for several generations had been eminent for their medical attainments and had held high positions in the profession. Five generations had carried on the family medical tradition. After his boyhood in Brussels the young Vesalius was sent to college at Louvain, where he made great progress. At sixteen he knew not only Latin but also enough Greek to correct the proofs of treatises by Galen, and enough Arabic to translate some of the works of the Moslem physicians. His Latin style is said to be singularly pure. Riolanus, whose example furnishes proof that even eternal opposition brings about a kind of immortality, and whose son Riolan the Younger was a bitter opponent of the doctrines of William Harvey, took great pains to show that Vesalius was but a shallow fellow, that his knowledge of anatomy was not much more than skin deep, and protested that he must have found some good scholar to write the Latin of his books.

What there was to know of the physics and mathematics of his time Vesalius mastered; but, as Charles Kingsley says: "His passion—the study to which he was destined to devote his life—was Anatomy."

[1] Read at a meeting of the Royal Australasian College of Physicians on September 24, 1943.

From Louvain the youth was sent to Paris, where he studied under a most eminent physician, Jacobus Sylvius. Sylvius believed, like all the medical men of the day, that everything written by Galen on anatomy must be correct, that if anything was found in the anatomy of the dog which did not agree with Galen's teachings, then the dog was wrong or had altered its anatomy since the time of Galen. Without doubt the celebrated citizen of Pergamum had learned much from the dissections of the anatomists of Alexandria; but the original portions of his doctrines were not founded on the anatomy of the human body, but on that of the ape and other animals. This had not prevented his teachings from preserving for hundreds of years a reputation of infallibility.

A critical and experimental examination of the doctrines of Galen never suggested itself as necessary to any of the medical men for nearly fourteen hundred years. To make such an examination would have been sacrilegious. The supreme object of the professor was to submit the text of Galen to a scholarly analysis, and to correct any alterations these texts had suffered at the hands of ignorant and careless scribes and translators. As a result, a knowledge of classical and oriental languages was considered as far more important for the study of anatomy than experimental research.

Jacques Dubois, or to give him his Latinized name, Jacobus Sylvius, was not only an anatomist, but also a learned classical scholar, and had even written a French grammar. He was notorious for his avarice and was known on one occasion to refuse to continue his course of lectures until one of the students had paid up his fees.

Another of the masters of Vesalius was John Winter, of Andernach. He was certainly more of a Greek scholar than an anatomist. When he was chosen as professor of anatomy at Paris, his qualifications rested on the fact that he had translated some of the works of Galen. Winter was greatly beloved by his pupils and appears to have been a most lovable man, greatly different from the churlish Sylvius. His anatomy, derived from the works of Galen and Vesalius, tells us that the only time that a knife had been seen in the hands of this anatomist was at dinner time.

Any idea of dissecting with their own hands during an anatomical demonstration was repugnant to these professors; it would have meant a loss of caste. Just as the physicians despised the manual work of the surgeons, the professors of anatomy looked upon it as below their dignity to take part in the manual work of dissection. The actual work was done by rude and ignorant servitors, whose sordid task was watched from on high by the professor, who read an explanation of the dissection from a textbook. The dissection was, as one would have expected, superficial and incomplete. Vesalius complains that at Paris the only muscles demonstrated were those of the stomach, and these were greatly mutilated. It is true that the work was far from being attractive, for bodies were few and far between (Vesalius speaks of only four dissections), and these had to last for several weeks. One can imagine that they became highly unpleasant, and for this reason dissections were undertaken only in winter. The entrails, which decomposed rapidly, were first demonstrated, but only superficially, and then the contents of the thoracic cavity and of the head were investigated, and finally the nerves, blood vessels, muscles and bones. These last were generally wanting at Paris, perhaps through carelessness on the part of the professor, but most probably owing to the foul condition of the body. One can well understand that a contemporary observer, Cornelius Agrippa, in his book, "The Vanitie of Arts and Sciences", calls an anatomical demonstration "the Slaughter House of both Physicians and Surgeons"; but Agrippa was evidently no lover of our profession, for he speaks of surgery "as infamous for its bloudy Cruelty and the Nastiness of its Practitioners". In fairness I must add that Agrippa had also a poor opinion of the physician. To quote him once again: "Physicians are the most wicked, quarrelsome, envious, lying persons in the world."

The spectators also were not of the type one would have expected to attend such a doleful exhibition. They looked upon the dissections as a popular entertainment, at which they could heartily enjoy the horrors. At Leyden, where the practical instruction in anatomy began a few years after the foundation of the university, the senate seriously debated the idea of giving relief to this demonstration by employing an orchestra of flute-players. In the anatomical theatre were gathered all the idlers of the town. The magistrates were invited to honour these rare events by their presence and were given front seats, while the medical men, who might have been expected to benefit from the display, were herded at the back. There was a constant in and out flow of spectators, and the noise of conversation made it difficult to concentrate one's attention on the words of the lecturer. The students played all sorts of practical jokes, mutilating the corpses and transposing the limbs. Anyone could ask questions of the lecturer, and many of them were absurd and facetious and added to the general confusion. Much time was wasted in futile discussions, such as "why is the stomach not situated just behind the mouth?" and "why have we not got hair on our noses?", to mention only a few.

Absurd statements, which any amphitheatre attendant could have proved false, were passed without criticism from one author to another, and went uncorrected for centuries. The womb was stated to be composed of at least seven compartments; the heart had only two or three cavities; the liver had five lobes. The models of the liver constructed centuries before by the Assyrians and Etruscans were truer to nature than these products of the imagination of the Middle Ages. One is forced to wonder if the predecessors of Vesalius were struck with blindness, and we find ourselves faced with one of the insoluble enigmas of the history of civilization. We are face to face with the amazing phenomenon that the authority of a single man held generations of scientists in thrall for nearly fifteen hundred years.

But let us return to our Vesalius—that most learned, famous and rare Baron Vesalius, as he was called by a Spanish contemporary. Sylvius found his new pupil disagreeably acute. It was the practice of the illustrious professor to read Galen on "The Use of Parts" to his class. He began fairly, and when he reached the middle of the first book at the point where the anatomy begins, he would say: "Gentlemen, we now come to a part too difficult for the comprehension of beginners. Were I to go through it with you, we should only be bewildering each other." To save trouble, therefore, the professor skipped any difficult matter and read out selections.

Becoming weary of studying the anatomy of the dog, Vesalius led some of his friends to rob the churchyards. On one occasion, when he went with some of his friends to the place where bodies of executed criminals were deposited and bones were plentiful, they found themselves attacked by a pack of fierce dogs; for some time the result of the fight was in grave doubt, and it looked as if Vesalius and his supporters would add their bones to the heap.

Another of the teachers of Vesalius was Gunther, of Andernach. He was a very different man from Sylvius. Gunther was an innovator and dissected human bodies; but Gunther exerted influence less by his writings than through his pupils, to whom he greatly endeared himself. Besides Vesalius he had as pupils Rondeletius the botanist, Servetus the martyr of the Reformation and Dryander the anatomist.

Meantime the French wars broke out, and we find Vesalius back again in his *alma mater*, Louvain. There he provided for the citizens a new and strange entertainment—a weekly anatomical demonstration to which all the leading citizens were invited. Anatomical subjects were scarce, and once again we find our anatomist frequenting the churchyards and places of execution.

A very gruesome story is told of Vesalius and his friend Gemma Frisius. On one of their excursions they came upon the place where the local criminals were executed and their bones deposited. Now there had been executed on that spot a noted robber, who, since he deserved more than an ordinary hanging, had been chained to the top of a high fire, made of straw, that was kept burning at some

distance from his feet. This dish had appealed to the crows, and as a result a dazzling white skeleton, picked clean by the birds, was displayed before the eyes of our anatomists. As Henry Morley, from whose essay, "Anatomy in Long Clothes", I have taken the story, tells us: "That was a flower to be plucked from its tall stem." Mounting upon the shoulders of his friend, Andreas climbed the charred stake and tore away whatever bones he found accessible. The trunk itself was bound by chains so firmly to the stake that it could not be dislodged. With the stolen bones hidden under their clothes the two young men returned to their lodgings. In the evening Vesalius stole out again alone, retrieved the remaining bones, buried them near by, and day by day smuggled them into his house. At last he possessed the long-coveted prize—a perfect skeleton. Naturally the local authorities did not approve of this escapade, and as Vesalius displayed his prize at his next demonstration it led to trouble.

This adventure, together with some remarks made by our anatomist as to the seat of the soul, aroused the suspicions of the orthodox professors. People began to hint at medical Lutherism, and Vesalius found it expedient to migrate to southern climes. In Italy anatomical dissections had for many years been undertaken, for Bartholomew Montagna boasted that he had witnessed fourteen demonstrations. In Italy Michelangelo, Leonardo da Vinci, Raphael and Titian had been able to acquire from the study of human anatomy the scientific knowledge necessary for their masterpieces.

After leaving Louvain, Vesalius served as an army surgeon in the service of the Emperor Charles V. Passing on to Venice, he gave anatomical demonstrations to large and wondering audiences. At Venice he also practised medicine and soon established an international reputation as a consultant, and when Francis I was fatally injured in a tournament, the royal surgeon Ambroise Paré called Vesalius in consultation; various experiments were performed on criminals to find out the location of the lance head which had caused the king's cerebral abscess.

The citizens of Padua founded a chair of anatomy, and Vesalius was appointed to it when only twenty-two years old. From 1537 to 1544 Vesalius taught anatomy, also holding professorships at Pisa and Bologna. Realizing that a constant supply of subjects was necessary for the proper study of anatomy, whenever an execution took place he persuaded the magistrates to hang the criminal in order to avoid mutilation. Very soon the authority of Galen and Avicenna began to weaken, and the students began to realize that they should not accept anything they could not see with their own eyes or touch with their own hands. All these dissections were the preparation for his immortal book, and in 1543, when he was only twenty-eight, he produced the "*De Humani Corporis Fabrica*". By this work Vesalius gained a place in the ranks of the great reformers. As Garrison tells us, Vesalius "was its reformer, not merely in regard to the textual overthrow of the Galenic tradition, but in the sense of incurring odium and ridicule, paying with his person, perhaps even risking his life". In this sense, he is like the other Renaissance reformers Luther and Paracelsus and Paré, and his influence is one of personality. We must judge the *Fabrica*, not by its faded pages and the scholastic flavour of its text, but in the spirit of the poet's words:

> Camerado, this is no book!
> Who touches this touches a man.

It would have been a miracle if the profession of faith of the medical Luther had been received with universal approbation. It has ever been the fate of genius to meet with ridicule and scorn; one has only to recall the cases of Harvey, Semmelweis, Sir Charles Bell, and in quite modern times, Joseph Lister. The old school of anatomists, wrapped in their admiration for Galen and his works, were not going to submit quietly to the dethronement of their idol. Led by Sylvius, a furious storm of misrepresentation and calumny broke upon the head of Vesalius. Sylvius accused him of being a monster of ignorance and impiety, even making a pun on his name and addressing him as "Vesanus", which means "madman". The outcry raised against him by so many grave authorities, in effect, created in many minds a vague dread of Vesalius and his writings. He fell into bad odour at court, and his reputation as a physician was damaged. Disgusted with all this controversy, Vesalius burnt all his notebooks and went to reside permanently at Madrid. From now on begins his decline, for in Spain the study of anatomy was discouraged by the Inquisition. Gradually Vesalius deteriorated into the fashionable physician, and science knew him not for the next ten years.

While Vesalius, deaf to everything but the seductions of court life, slumbered in Madrid, the great struggle against the strongly entrenched forces of Galenism went on. Fuchs, the great botanist at Tübingen, Rondeletius at Montpellier, Massa at Venice, carried on the fight against the old views. Then a great pupil of Vesalius, in the person of the anatomist Gabriel Fallopius, entered the lists. Fallopius had mastered all the knowledge of his great teacher, and imbued with his spirit of research, had pushed on and made further discoveries. After eleven years of dissection he published in 1561 his "Anatomical Observations". The reception by Vesalius of the anatomical work of his pupil was not worthy of so great a man. Forgetting that he had been out of touch with anatomical science for nearly twenty years, he resented the advances made by his pupil. No doubt the enemies of Vesalius, delighted at the chance of humbling their former adversary, did not hesitate to draw comparisons which did not please Vesalius, and the latter at last realized that the name of Vesalius was being gradually forgotten in the world of science and that his was only the shadow of a great name.

> Vesalius! who's Vesalius? This Fallopius
> It is who dragged the Galen-idol down.

All the aspirations of his youth revived, and Vesalius decided to stage a "come-back". Edith Wharton has well expressed it in her poem "Vesalius in Zante":

> At least
> I repossess my past, am once again
> No courtier med'cining the whims of kings
> In muffled palace-chambers, but the free
> Friendless Vesalius, with his back against the wall,
> And all the world against him.

For some reason, which has been greatly discussed, but for which no solution has been found, Vesalius made a vow to carry out a pilgrimage to the Holy Land. While he was in the Holy Land, the Senate of the Republic of Venice in 1562 sent after Vesalius, asking him to return and occupy the chair of anatomy which had been rendered vacant in the previous year by the death of Fallopius. Vesalius set out on his fatal return voyage from Joppa. A violent storm drove the vessel upon the Ionian Islands and wrecked it on the island of Zante, on which island, stricken with cold and hunger, the great anatomist died on the fifteenth day of October, 1564, six months before the birth of Shakespeare and fourteen years before that of William Harvey. A friendly goldsmith of Venice found the body of Vesalius in a hut and gave it modest burial in the Church of Our Lady in Zante, of which church, destroyed by earthquake, nothing remains at the present day. In the words of Sir Thomas Browne: "The iniquity of oblivion blindly scattereth her poppy, and deals with the memory of men without distinction of perpetuity."

After the death of Vesalius, Galenism once again raised its head under the influence of Riolan, whose son was one of the bitterest opponents of the doctrines of Harvey, and in Italy and in Germany under the influence of two reactionaries, in the persons of Fabricius of Acquapendente and Bauhinus the botanist. As Sir Michael Foster tells us, "the teaching of Fabricius in 1599 was little more than a repetition of the teaching of Galen".

It is to the Dutch anatomists of the next two centuries that we owe the final acceptation of the Vesalian anatomy. The University of Leyden must be given the credit, in that its professors, Petrus Paaw, Van Horne, Nuck, Bidloo and Bernard Siegfried Albinus, produced new editions of the works of Vesalius.

Before I close I should like to say a few words about the anatomical work of Leonardo da Vinci. The pre-eminence of Vesalius finds in this universal genius the only possible rival. Unfortunately the studies of da Vinci, which antedated those of Vesalius by about fifty years, were never published, and were only discovered some centuries later. Whether the studies of da Vinci were known to Vesalius is a question which will never be settled. There is no direct evidence; but the influence of the artist anatomists of the early sixteenth century is undoubtedly reflected in the figures of Vesalius; in his anatomical pictures we at last have pictures drawn from nature, and we get away from the diagrammatic illustrations so popular in the Middle Ages.

THE RH FACTOR: ITS INCIDENCE IN A SERIES OF VICTORIAN RED CROSS DONORS.

By R. T. SIMMONS, J. J. GRAYDON, RACHEL JAKOBOWICZ AND LUCY M. BRYCE,

From the Commonwealth Serum Laboratories, the Walter and Eliza Hall Institute, and the Red Cross Blood Transfusion Service (Victorian Division), Melbourne.

A NEW agglutinable factor in human blood unrelated to other known agglutinogens was identified and designated "Rh" by Landsteiner and Wiener (1940). This factor was detected when it was found that the serum of rabbits immunized with the red blood cells of Rhesus monkeys, after appropriate absorption, agglutinated 39 out of 45 specimens of human blood independently of their group and of the M and N type and the property P.

An investigation of the Rh factor in families by Landsteiner and Wiener (1941) led to the conclusion that the factor is inherited as a simple Mendelian dominant, which is not sex-linked, and which is probably genetically independent of the blood groups and the factors M and N. In an examination of the blood of 448 white subjects, they found that in 84·6% the red cells were Rh-positive (that is, were agglutinated by anti-Rh serum) and in 15·4% they were Rh-negative.

The practical significance of the Rh factor was quickly recognized. It is of special importance in the following three types of case.

1. A few Rh-negative persons have the ability to produce anti-Rh agglutinins if they are given one or more transfusions of Rh-positive blood, and in such cases further transfusions with Rh-positive blood may result in mild, severe or fatal hæmolytic reactions.

2. Women whose blood is Rh-negative may have children who inherit Rh-positive blood from their fathers. In some such women, presumably owing to some defect in the placenta, fœtal blood enters the maternal circulation and stimulates the production of anti-Rh agglutinins. Should such women be given transfusions of Rh-positive blood during pregnancy or subsequently while these agglutinins persist (which may be for months or years), hæmolytic reactions are likely to occur.

3. Much evidence has now been brought forward supporting this concept of iso-immunization (immunization by the same species) as the explanation of cases of *erythroblastosis fœtalis*. The agglutinins, which may be found in the mother's blood as a result of passage of fœtal red cells through a defective placenta, may then pass back into the fœtal circulation and interact with the infant's red cells. In a small percentage of cases blood factors other than the Rh factor have also been shown to be capable of causing iso-immunization of the mother with resulting agglutinins; but in over 90% of the cases the Rh factor is the cause of the incompatibility which results in one or other of the manifestations of *erythroblastosis fœtalis*.

In an analysis of the obstetric histories of seven selected mothers with Rh-negative blood (37 pregnancies), Levine, Burnham, Katzin and Vogel (1941) found there were ten normal babies, seven with *erythroblastosis fœtalis*, three neonatal deaths, five stillbirths and ten abortions or miscarriages (at least six spontaneous), and in two instances no data were available. Histories such as these indicate the important part played by the Rh factor in the iso-immunization of the mother and the possible effect of the iso-agglutinins so produced on most of the babies. In many instances the babies born unaffected to such mothers have been shown to have Rh-negative blood. Affected infants almost invariably have Rh-positive blood.

To study more fully the role of the Rh factor in intragroup hæmolytic transfusion reactions and in *erythroblastosis fœtalis*, the reader is referred to the following papers: Levine and Stetson, 1939; Wiener and Peters, 1940; Levine and Katzin, 1940; Levine, Katzin and Burnham, 1941; Levine, 1941; Wiener, 1941; Levine, Vogel, Katzin and Burnham, 1941; Levine, Burnham, Katzin and Vogel, 1941; Wiener, 1942; Boorman, Dodd and Mollison, 1942.

An improved technique for the preparation of anti-Rh serum in which guinea-pigs are used instead of rabbits has been described by Landsteiner and Wiener (1942). The preparation of potent anti-Rh serum in guinea-pigs in amounts sufficient for large-scale testing of blood samples is, however, very laborious. Workers in this field are therefore on the constant lookout for human high titre anti-Rh serum. Such high titre serum is rare, but when it is found it may be far more potent than the absorbed guinea-pig serum. Human anti-Rh serum has been used in the surveys in America and England by Levine *et alii* and by Boorman *et alii* respectively.

The purpose of the present investigation was to ascertain the incidence of the Rh factor in the blood of donors of the Red Cross Transfusion Service in Melbourne, in order to establish a pool of known Rh-negative donors for mothers and erythroblastotic infants requiring blood transfusion, and for Rh-negative patients requiring repeated transfusions.

MATERIALS AND METHODS.

Standard Anti-Rh Serum.

We had on hand a small quantity of unabsorbed anti-Rh guinea-pig serum and also a sample of a potent human anti-Rh serum said to be of group AB. These had been sent, on request, to the Director of the Commonwealth Serum Laboratories by Dr. K. Landsteiner, to whom we are most grateful. The guinea-pig serum had been prepared by intense immunization with Rhesus blood and was absorbed by us according to Dr. Landsteiner's directions (personal communication) at a dilution of 1/10 for one hour at room temperature with a mixture of A and B Rh-negative washed cells. The serum, after absorption, was Rh-specific and gave equally good reactions at the original dilution of 1/10 and at 1/40 when tested in tubes with a 1% to 2% cell suspension.

Human Anti-Rh Serum (Mrs. C.).

The serum used by us in this investigation was one from a Red Cross donor (Mrs. C.), in which atypical agglutinins were detected by one of us (R.J.). The agglutinins were shown (by R.T.S.) to correspond to the Rh factor of Landsteiner and Wiener. It was ascertained that Mrs. C. had, eight months previously, given birth to an infant which suffered from *erythroblastosis fœtalis* and lived only two days. Mrs. C.'s blood was of group A (subgroup A_1), and her serum was found to agglutinate a high percentage of other group A and group O cells. When titrated on "Army" tiles (Bryce and Jakobowicz, 1941), the serum was found to agglutinate group B Rh-negative cells to a titre of 1/120 and most group A or O cells to a titre of 1/120. When titrated in tubes and incubated for two hours at 37° C., the serum gave a positive Rh sediment reading in a dilution of 1/1,000.

A further donation of blood by Mrs. C. was collected in oxalate solution and the serum was obtained from the plasma by the addition of a calculated amount of calcium chloride. After filtration through Seitz "EK" filter pads,

"Merthiolate" to give a concentration of 1/10,000 was added to one-half of the serum; the other portion was left without preservative. All the serum obtained was inactivated at 56° C. for fifteen minutes before being stored at 5° C. The serum was equally active before and after being heated.

As the blood of Mrs. C. was of group A, her serum could be used for the detection of the Rh factor only in blood of group A and group O. For use with blood of group B and AB it was necessary to absorb the anti-B agglutinins from the serum. This was done by one or other of the two following methods: (*a*) by absorption with washed cells, (*b*) by absorption with wet or dried saliva from group B secretors.

Absorption with Washed Cells.

Group B Rh-negative cells were identified with the human serum of group AB sent to us by Dr. Landsteiner. Samples of such cells were washed twice with large volumes of sterile saline solution prior to use for absorption. It was found that complete absorption was obtained when the volume of packed cells used was a little more than half that of the serum. The cells were added to the serum slowly in two lots at an interval of about fifteen minutes whilst the tubes were rotated. The serum absorbed was part of the lot left without antiseptic agent. The mixture was allowed to stand at room temperature for one hour, during which time it was shaken occasionally. After centrifugation the supernatant fluid was transferred to sterile tubes and "Merthiolate" was added to give a concentration of 1/10,000, and as an additional precaution the serum was inactivated at 56° C. for fifteen minutes. Tests with a number of known Rh-positive and Rh-negative cells of all groups showed that the absorbed serum was specific. Several lots of absorbed serum have now been prepared by means of the same technique, but with group B Rh-negative cells from different subjects, and in each instance the serum has been proved specific. No appreciable drop in Rh titre occurred on absorption.

Absorption with Wet or Dried Saliva from Group B Secretors.

It has been shown by Jakobowicz and Bryce (1941) that the addition of suitable saliva from "secretors" removes iso-agglutinins. Wiener (1942) recommends a somewhat similar technique for the absorption of A and B factors from anti-Rh serum, one part of saliva being used to two parts of serum. We have found that a 1/10 solution of saliva gave satisfactory absorption when used in the following way.

Saliva from a known group B "secretor" was heated in a boiling water-bath for twenty minutes and centrifuged; the supernatant opalescent fluid was removed and diluted to 1/10 with normal saline solution. A mixture of equal amounts of this saliva dilution and serum was allowed to stand for one to two hours at room temperature, the receptor substances of the saliva thus being enabled to absorb the anti-B agglutinins of the serum. The addition of liquid saliva results, however, in a proportionate dilution of the anti-Rh serum. To overcome this disadvantage, absorption of the unwanted agglutinins with dried saliva was attempted. A sample of suitable saliva was dried for us by Miss M. Bick, of the Walter and Eliza Hall Institute. As a preliminary, the combining power of this particular sample of saliva was tested before it was dried. It was found that 0·1 millilitre of a tenfold dilution of the saliva in normal saline solution was sufficient to remove all iso-agglutinins from 0·1 millilitre of serum. Therefore the total amount collected (eight millilitres) of undiluted saliva should be theoretically sufficient to absorb the agglutinins of 80 millilitres of serum. Actually it was found that the dried product from eight millilitres of saliva (weighing 0·128 gramme) was sufficient for the absorption of 33 millilitres of serum.

Comparison of Different Anti-Rh Sera.

By means of the human anti-Rh serum of group AB sent by Dr. Landsteiner, the Rh factor in the blood of 36 selected members of the laboratory staff was determined, with the results shown in Table I. As only a limited amount of the foregoing serum was available, we made a few preliminary tests to ascertain whether agglutination on slides, which is more economical of material than tube tests, would be satisfactory. The slides were incubated at 37° C. in a moist chamber,[1] and rather to our surprise we found that good agglutination was present after fifteen minutes, and that no additional samples were agglutinated after further incubation. The results were in agreement with those obtained in a parallel series of tube tests. To conserve the serum, therefore, all subsequent tests with this serum were made on slides, by means of pipettes which delivered 30 to 40 drops per millilitre.

TABLE I.

Blood Group.	Rh-positive.	Rh-negative.
Group A, 9 ($7 A_1$, $2 A_2$)	8	1
Group B, 11	7	4
Group O, 9	8	1
Group AB, 7	6	1

The 36 blood samples were then tested with the absorbed anti-Rh guinea-pig serum at dilutions of 1/10 and 1/40 in tubes at room temperature (as recommended by Landsteiner and Wiener) and on slides. The agglutination on slides was very poor; but readings after 30 and 60 minutes were in agreement with the results of the previous tests. The readings in tubes made at 30, 60 and 120 minutes were also in agreement, and the appearance of the sediments was as described by Landsteiner and Wiener. It was noted at this stage that even after fifteen minutes the positive sedimented cell pattern was obviously different from the appearance seen in Rh-negative samples. We therefore made preliminary readings at fifteen minutes in our later tube tests.

The 36 controls were then tested with anti-Rh serum from Mrs. C. The tests were made on slides incubated at 37° C. and at room temperature,[2] and in tubes incubated at 37° C. The results obtained in tubes and on slides at both temperatures were in agreement, and they also agreed with those obtained with the human and the guinea-pig serum received from Dr. Landsteiner. Mrs. C.'s serum was by far the strongest of the three and caused well-defined agglutination on slides after fifteen and thirty minutes (see Figure I). It was noted, however, that while

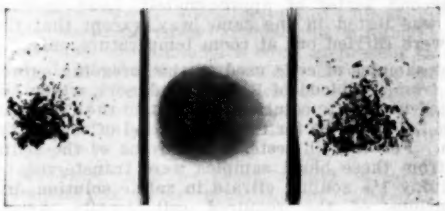

FIGURE I.

Rh agglutination on glass slide. The photograph (actual size) shows one Rh-negative and two Rh-positive reactions. Equal parts of Mrs. C.'s serum (diluted 1/4) and 4% cell suspension were mixed and allowed to stand for thirty minutes at room temperature in a moist chamber before being examined.

27 of 29 Rh-positive blood samples were more strongly agglutinated by Mrs. C.'s serum than by either of the other sera, the remaining two were more strongly agglutinated by the human anti-Rh serum from Dr. Landsteiner. (This serum had been put in ampoules and

[1] Immediately after the serum and cells are mixed, all slide tests in this investigation have been placed in closed Petri dishes containing wet blotting paper. In such moist chambers slides may be left for some hours at either room temperature or 37° C. without the occurrence of evaporation sufficient to interfere with the accurate reading of the results.

[2] Room temperature during this investigation has usually been about 20° C. On occasions it has risen to 25° C.

dated twelve months previously, and so it is possible that it may have been originally as potent as that of Mrs. C.) The difference seen in the agglutinations, however, did suggest that these two sera might possibly differ qualitatively.

Determination of Optimal Conditions for Use of Human Anti-Rh Serum (Mrs. C.).

Further comparative tests on slides and in tubes were made with 100 samples of blood from Red Cross donors. The slides were incubated at 37° C. and room temperature and the tubes at 37° C. only. Readings of slide tests were made after thirty, sixty and ninety minutes, and of tube tests after thirty, sixty and ninety minutes and again overnight. On slides the serum and cell suspensions were mixed thoroughly with toothpicks soon after the cell suspensions were added. The results obtained with slide and tube tests were in agreement, and no difference was noted between the agglutination obtained at 37° C. and that obtained at room temperature. Blood samples giving Rh-negative reactions with the foregoing tests were checked by tube tests with anti-Rh guinea-pig serum. There were no discrepancies. It was also found that the anti-Rh serum of Mrs. C. when diluted 1/5 gave strong agglutination on slides with all samples giving agglutination with undiluted serum.

Since these comparative tests on 100 samples revealed no discrepancies, 1,000 samples of blood were then tested on slides only, one drop of Mrs. C.'s serum diluted 1/4 and one drop of a 4% cell suspension being used. Preliminary tests had given identical results with 2% and 4% cell suspensions, but the agglutination with 4% suspension was rather more easily read. Readings were made after thirty and sixty minutes' incubation at 37° C. Those which failed to react were then retested on slides with undiluted serum and a 2% cell suspension at 37° C. and at room temperature, readings being made after thirty and sixty minutes as before. The "negative" cells were also submitted to tube tests with the absorbed guinea-pig serum used in a dilution of 1/40, with an equal volume of 1% to 2% cell suspension. Readings were made after fifteen, thirty, sixty and one hundred and twenty minutes, by examining the sediment through the bottom of the tube with a hand lens, as recommended by Landsteiner and Wiener. Known control specimens of blood were used daily throughout the investigation.

A second series of approximately 1,000 specimens of blood was tested in the same way, except that the slide tests were carried out at room temperature only.

Most samples of cells used in the foregoing survey were taken from the blood of Red Cross donors, which had been collected in oxalate solution and sent to the Commonwealth Serum Laboratories for the preparation of serum for transfusion. For the Rh tests, a few drops of the sedimented cells from these blood samples were transferred to tubes containing 1% sodium citrate in saline solution, in which suspensions of the required cell density were made. Usually the cells were tested within six hours of collection, but a few tests were performed after eighteen hours' storage overnight at 5° C.

A third series, consisting of blood samples from 638 new volunteers for the Red Cross Blood Transfusion Service, has also been examined for the Rh factor by the "Army tile" technique, parallel tests being made at room temperature and 37° C. with Mrs. C.'s serum.

The results of all slide tests made with Mrs. C.'s serum are shown in Table II. It is interesting to note that tube tests with the guinea-pig anti-Rh serum did not reveal a single specimen of Rh-positive blood in the 458 samples classified as Rh-negative by Mrs. C.'s serum.

While this survey was in progress a few millilitres of serum were obtained from a soldier (E.A.) who had previously received transfusions from nine different donors. When cross-typing was carried out with a view to further transfusions, his serum was found to agglutinate the cells of several prospective donors of the homologous group (group O). Further tests showed that this patient was Rh-negative, and that the persons whose cells were agglutinated by his serum were Rh-positive. The anti-Rh titre of his serum was estimated as 1/120 on "Army tiles" and on slides it was almost as potent as that of Mrs. C. (Unfortunately the severity of this patient's illness and his subsequent death made it impossible to collect further blood from him.) All tests with this serum were made at 37° C., as it contained "cold agglutinins".

Serum E.A. was immediately used for checking the results obtained with Mrs. C.'s serum in samples of group O cells. Not one discrepancy was found in the first hundred specimens of group O blood tested, thirty of which were Rh-positive and seventy Rh-negative.

Some of serum EA was then absorbed and used for testing cells of groups A, B and AB. It was found that occasional specimens of blood classified as Rh-negative by Mrs. C.'s serum and the guinea-pig serum gave positive reactions with serum EA.

Of 142 samples of group A which were Rh-negative with Mrs. C.'s serum, eight gave a positive reaction with serum E.A. Subsequently, one specimen of group O blood among 76 classified as Rh-negative with Mrs. C.'s serum was found to be Rh-positive with serum E.A. These numbers are, however, too small to show any statistically significant difference between the reactions of cells of groups O and A.

Owing to the limited volume of serum E.A. available, we have used it mainly to retest samples previously classified as Rh-negative. For this reason, only a few specimens of groups B and AB have been retested with this serum, and to date the results have agreed with those obtained with Mrs. C.'s serum.

A comparison of the results obtained with serum E.A. and Mrs. C.'s serum is shown in Table III.

These results are similar to those of other workers, who have found that tests with different human anti-Rh sera, although substantially in agreement, give occasional discrepant results.

It is probable that these discrepancies are associated with sub-types of Rh agglutinogen. Wiener (1942), working with different human anti-Rh sera, came to the conclusion that there are at least two Rh agglutinogens analogous to the two major varieties of A agglutinogen, A_1 and A_2.

TABLE II.
Results of Slide Tests with Anti-Rh Serum Mrs. C.

Blood Group.	Number of Tests.	Rh-negative.		Rh-positive.	
		Number.	Percentage.	Number.	Percentage.
O	1,122	191	17·0	931	83·0
A_1	712	126	17·7	586	82·3
A_2	190 } 1,124	39 } 207	20·5 } 18·4	151 } 917	79·5 } 81·6
A (sub-group not determined)	222	42	19·0	180	81·0
B	260	45	17·3	215	82·7
AB	87	15	17·2	72	82·8
Total	2,593	458	17·67	2,135	82·33

TABLE III.

Comparison of Results of Slide Tests with Human Anti-Rh Serum (E.A.) and Human Anti-Rh Serum (Mrs. C.).[1]

Blood Group.	Number of Tests.	Rh-negative with Mrs. C.'s Serum.		Rh-positive with Mrs. C.'s Serum.	
		Rh-negative Serum (E.A.).	Rh-positive Serum (E.A.).	Rh-negative Serum (E.A.).	Rh-positive Serum (E.A.).
O	124	75	1	0	48
A	162	134	8 ($6\ A_1$, $2\ A_2$)	0	20

[1] The finding of nine Rh-positive blood samples with serum E.A. among 209 classified as Rh-negative with Mrs. C.'s serum indicates that, had we been able to use both types of serum for our whole series, the incidence of Rh-negative reactors would be approximately 17%.

He suggested that the sub-types be designated Rh_1 and Rh_2. Davidsohn and Toharsky (1942) have shown that there are at least three Rh factors in human blood—Rh_1, Rh_2 Rh_3 *et cetera*—and that antigenic differences exist between the Rh factors in man and in the Rhesus monkey. They point out that it is essential to use at least three different anti-Rh human sera for tests for the Rh factor.

In consideration of this aspect of the Rh problem, an attempt was made to examine the variation in agglutinability and absorptive power of different samples of Rh-positive cells in relation to the Rh agglutinin. When this experiment was commenced we had only one type of serum, that of Mrs. C., at our disposal.

For the titration of agglutinability, 1% suspensions of sixty different samples of group O Rh-positive cells were mixed on "Army tiles" with serial dilutions of serum, and readings were taken after incubation at 37° C. for two hours.

For the absorption test a 1/3 dilution of serum was mixed with washed red cells of the same sixty samples of group O Rh-positive cells (0·15 millilitre of serum containing 0·02 millilitre of packed cells) and allowed to stand for absorption for two hours at 37° C. The sixty supernatant sera were then titrated on "Army tiles" with the same sample of Rh-positive cells.

The results may be summarized as follows: forty-six samples showed good agglutinating power and good absorptive power; four samples showed good agglutinating power and poor absorptive power; ten samples showed poor agglutinating power and poor absorptive power.

These results indicate that two sub-types of Rh antigens can be differentiated by their different absorptive power for the anti-Rh agglutinins found in Mrs. C.'s serum. A distinction based on this property resembles that between the sub-groups A_1 and A_2, which may also be differentiated by absorption tests with anti-A serum.

As indicated above, Mrs. C.'s serum has failed to agglutinate a few samples of cells of group A and one of group O, which gave agglutination with serum E.A. This suggests at least a third variety of Rh-positive cells.

The Rh-negative percentage in our series is significantly higher than that found in England and America (Table IV). If it is assumed that the basic frequency of occurrence of the Rh factor in our population is the same as it is in the overseas series, and that our technique has been adequate, there must be at least a fourth type of Rh antigen which does not react with either of the human sera (Mrs. C. and E.A.) we have used, or with the anti-Rh guinea-pig serum received from Dr. Landsteiner.

TABLE IV.

The Rh Percentages found in Five other Surveys.

Authors.	Number of White Persons Tested.	Rh-negative (Percentage.)	Rh-positive. (Percentage.)
Landsteiner and Wiener (1941)	448	15·4	84·6
Levine, Vogel, Katzin and Burnham (1941)	829 (male)	13·8	86·2
	206 (female)	11·6	88·4
Wiener (1942)	777	14·4	85·6
Boorman, Dodd and Mollison (1942)	1,610 (Groups A and O)	14·85	85·15
Dahr	1,756	16·0	84·0

DISCUSSION.

As stated above, our percentage of Rh-negative persons is higher than that reported overseas. It is possible that our population has a naturally higher Rh-negative percentage than those comprising the other series examined elsewhere. Alternatively, our technique or serum may have been inadequate to detect some weak Rh-positive reactors or Rh-positive reactors of particular sub-groups. The second potent human anti-Rh serum (E.A.) which was found late in the survey has given results substantially in agreement with those obtained by the use of the first human anti-Rh serum (Mrs. C.) and the anti-Rh guinea-pig serum; but serum E.A. did agglutinate some blood samples with which the other sera did not react. Of these blood samples, those which we were able to test with the last portion of human anti-Rh serum of group AB sent to us by Dr. K. Landsteiner were also agglutinated by it. One point of interest is that Mrs. C.'s agglutinins were the result of stimulation by one Rh-positive sample only, that of her own infant, while those of E.A. may have been produced by several of the nine donors from whom he had received blood, so that a more "polyvalent" antiserum resulted.

As knowledge concerning the Rh factor becomes more widespread, the accidental production of "polyvalent" serum by the giving of successive transfusions of Rh-positive blood to Rh-negative recipients, as in this case, will or should become a much less likely event. Until more satisfactory methods of production of polyvalent anti-Rh serum of high titre are devised, it will be necessary for those undertaking the preparation of anti-Rh serum in amounts sufficient for current demands to test samples of blood from as many persons as possible amongst those likely to have anti-Rh agglutinins. These will be mostly women who have had erythroblastotic babies. A selection of such samples, which, in combination, is shown to detect the greatest percentage of Rh-positive blood, should form the testing material in subsequent identifications of Rh-negative donors. The complexity of the subject, and the difficulty in obtaining large amounts of suitable serum, make it advisable to confine such work at present to those large central laboratories in which there are suitable facilities and personnel with sufficient experience to use to the greatest advantage of the community as a whole, the meagre and uncertain supplies of anti-Rh sera which are at present available.

The procedures which we think should be carried out by pathologists or other practitioners in relation to individual patients, for whom consideration of the Rh factor may be important, are described in an appendix to this paper.

It will be noted that we have departed from the practice advocated by most other workers of using only the tube technique for the identification of Rh agglutination. Our control tests have shown perfect agreement between the tube and the slide or tile technique. Choice of method is often a matter of personal predilection based on experience, and we see therefore no reason to abandon, under suitable conditions, the use of slides or tiles, which for large-scale surveys is much quicker and (particularly in the case of slides) more economical of material than is the tube technique. A further advantage of slides is that, if necessary, they can be examined microscopically without disturbance of the sediment. We would emphasize, however, that slides or tiles can be used to the best advantage only when very potent serum is available, and that we do not advocate their use for the detection of anti-Rh agglutinins. The technique recommended in such cases is described in the appendix.

SUMMARY.

1. Samples of blood from 2,593 adult white persons have been examined for the Rh factor by means of the slide technique, a high titre human anti-Rh serum (Mrs. C.) being used; 458 (17·67%) of these samples were found to be Rh-negative. None of the samples classified as Rh-negative by this method reacted with the anti-Rh guinea-pig serum received from Dr. K. Landsteiner, when tested by the standard tube method. Subsequent tests with another specimen of human anti-Rh serum (E.A.) detected an occasional Rh-positive specimen of blood amongst those previously classified as Rh-negative.

2. These results, and our own absorption experiments, confirm opinions of other workers that the Rh factor is not a single entity, and that different human anti-Rh sera give results which, although substantially in agreement, show occasional discrepancies. Human anti-Rh sera selected for testing purposes should therefore be those which in combination detect the greatest percentage of Rh-positive blood samples.

3. The technical methods used for the testing and absorption of human anti-Rh serum are described.

4. The problems connected with the provision of Rh-negative donors by an organization such as the Red Cross Blood Transfusion Service, and the best means available at the present time for the avoidance of transfusion reactions due to the Rh factor, are discussed in the appendix to this paper.

ACKNOWLEDGEMENTS.

We are most grateful to the Red Cross donor, Mrs. C., whose willing cooperation and donations of blood have made this investigation possible, to Dr. Ella Macknight for helpful advice and to Miss M. Kennedy and others who helped in various ways.

APPENDIX.

The Provision of Anti-Rh Testing Serum and Rh-Negative Donors.

The data published in this paper make it clear that supplies of potent anti-Rh serum in any quantity are, in the present state of our knowledge, dependent chiefly on the detection and willing cooperation of women with Rh-negative blood, who have become highly immunized by the Rh-positive blood of their own infants. Furthermore, we have to consider: (i) that people with Rh-negative blood comprise only 15% to 17% of the total population; (ii) that the proportion of this 17% who become immunized to Rh-positive cells is very small; (iii) that the presence of Rh antibodies may be temporary. It is obvious, therefore, that under present conditions it may be impossible to maintain reserves of anti-Rh serum sufficient to guarantee supply on request as is done for high titre blood grouping serum of groups A, B and O.

The position has been considered by a subcommittee of the Victorian Red Cross Blood Transfusion Service Committee in collaboration with the Director of the Commonwealth Serum Laboratories, and the following decisions and recommendations were made.

1. The Director of the Commonwealth Serum Laboratories has agreed to undertake the preparation, testing and distribution of anti-Rh human serum when available. It is contemplated that small amounts of this serum will be made available only to approved laboratories, such as those of maternity and other large hospitals, civilian and military. Some of the serum should be used to classify the blood of members of the staff (particularly those of group O), so that their cells may be used subsequently as Rh-positive and Rh-negative controls when testing patients' serum for the presence of anti-Rh agglutinins.

2. The Red Cross Blood Transfusion Service (Victorian Division) is prepared to test, free of charge, specimens of blood for the Rh factor from patients for whom the test is likely to be of special importance. Such patients are: (*a*) women with an obstetric history of (i) erythroblastosis, (ii) recent or repeated abortions, or stillbirths, or both (this is a doubtful category in the present state of knowledge); (*b*) patients who are likely to need repeated blood transfusions. For these tests, five to ten cubic centimetres of blood taken aseptically into a sterilized tube, without anticoagulant, together with full clinical notes, should be sent to the Serologist, Red Cross Blood Transfusion Service, c.o. Walter and Eliza Hall Research Institute, Sydney Road, Parkville, Victoria, N.2.

3. To pathologists who wish to perform direct cross-matching tests between the blood of individual patients and that of donors—and this, if anti-Rh testing sera and known Rh-positive and Rh-negative control cells are not available, is the only way to eliminate or reduce the possibility of reactions due to the Rh factor—the methods of Landsteiner, Wiener and Levine, described by Boorman, Dodd and Mollison (*British Medical Journal*, November 7, 1942, page 537), are recommended. Attention is directed to the modification suggested by Taylor *et alii* (*British Medical Journal*, November 14, 1942, page 573). We would point out that in our opinion the interpretation of "sediment reading" is not always easy, especially if opportunity for frequent practice is lacking. It is, nevertheless, the best method available, although, as has been indicated in the present paper, a slide or tile test may also reveal the reaction in cases in which the anti-Rh agglutinins are sufficiently potent, and may be used in conjunction with or as a preliminary to tube tests.

4. In respect of the metropolitan requirements of Melbourne, requests for Rh-negative blood or donors may be made to the Call Office of the Victorian Division of the Red Cross Blood Transfusion Service (telephone, F 9337). Subject to the usual conditions under which Red Cross donors are supplied, every effort will be made to provide either an individual donor or blood from the bank for emergency transfusions for the following types of patient: (*a*) erythroblastotic babies, (*b*) women who have had erythroblastotic babies. The patient's blood group should be specified, if possible, in order to conserve supplies of group O Rh-negative blood.

5. Although it will do so if possible, the Red Cross Blood Transfusion Service cannot guarantee to supply Rh-negative blood on demand for other types of patients, who, in our opinion, rarely rank as "urgent emergencies" in respect of the Rh factor. In such cases, preliminary tests should be made whenever possible before Rh-negative blood is asked for (*vide* paragraphs 2 and 3 above), so that the limited supply of known Rh-negative donors may not be used unnecessarily for Rh-positive patients.

TABLE V.

	Part I: Total Blood Samples Tested with Human Anti-Rh Serum Mrs. C.			Part II: 1,048 Blood Samples Tested.				
				With Human Anti-Rh Serum Mrs. C.			Non-reactors Tested with Five Additional Anti-Rh Sera.	
Blood Group.	Number Tested.	Rh-negative.	Percentage.	Number Tested.	Rh-negative.	Percentage.	Rh-negative.	Percentage.
O	1,627	272	16·7	505	81	16·0	77	15·2
A_1	1,008	188	18·7	296	62	20·9	57	19·3
A_2	284	59	20·8	94	20	21·3	19	20·2
(A_1 and A_2) Total	1,514[1]	289	19·1	390	82	21·0	76	19·5
B	378	62	16·4	118	17	14·4	16	13·6
AB	122	20	16·4	35	5	14·3	5	14·3
Total ..	3,641	643	17·66	1,048	185	17·65	174	16·60

[1] Includes 222 of Group A, the sub-groups of which have not been determined.

ADDENDUM.

Since this paper was submitted to press, a further 1,048 blood samples have been examined; these bring to 3,641 the total number tested on slides and "Army tiles" with the human anti-Rh serum Mrs. C. The Rh-negative percentage obtained with this serum was 17·66 for the whole series (see Table V, Part I).

Of the last 1,048 blood samples tested, 185 (17·65%) were Rh-negative with Mrs. C.'s serum. When these non-reactors were retested with four other recently acquired human anti-Rh sera (by means of the slide technique) and with the guinea-pig anti-Rh serum (by means of the tube technique), eleven gave positive results with one or more of these sera, reducing the total of non-reactors to 174 (16·60%) (see Table V, Part II).

The four new human anti-Rh sera, one of which was kindly supplied by Dr. Vera Krieger, of the Women's Hospital, Melbourne, and one by Dr. Julian Smith, all gave good agglutination reactions on slides after thirty minutes' incubation at 37° C. Of the human sera used, three were of group A and two were of group O. In a large series of tests made with these five human anti-Rh sera, three different combinations of reactions were obtained.

The difference between the percentage of Rh-negative subjects in group A and in other groups suggests that the Rh factor may not be entirely independent of the A, B, O system. A study of larger series would be necessary to obtain adequate data on this point.

BIBLIOGRAPHY.

K. E. Boorman, B. E. Dodd and P. L. Mollison: "The Clinical Significance of the Rh Factor", *British Medical Journal*, November 7, 1942, page 535; *ibidem*, November 14, 1942, page 569.

L. M. Bryce and R. Jakobowicz: "The Estimation of the Iso-Agglutinin Titre of Human Serum and its Practical Applications", THE MEDICAL JOURNAL OF AUSTRALIA, Volume I, March 8, 1941, page 290; "The Iso-Agglutinin Titre of Pooled Serum or Plasma", *ibidem*, March 15, 1941, page 318.

P. Dahr: "*Die bisherigen Untersuchungen über die Vererbung der neuen agglutinoblen Blutkörpercheneigenschaft Rh*", *Zeitschrift für Immunitätsforschung und experimentelle Therapie*, 1942, Volume CII, page 165.

I. Davidsohn and B. Toharsky: "The Rh Factor: An Antigenic Analysis", *American Journal of Clinical Pathology*, Volume XII, August, 1942, page 434.

K. Landsteiner and A. S. Wiener: "An Agglutinable Factor in Human Blood Recognised by Immune Sera for Rhesus Blood", *Proceedings of the Society for Experimental Biology and Medicine*, Volume XLIII, February, 1940, page 223; "Studies on an Agglutinogen (Rh) in Human Blood Reacting with Anti-Rhesus Sera and with Human Isoantibodies", *The Journal of Experimental Medicine*, Volume LXXIV, October 1, 1941, page 309; "Tests for the Rh Factor with Guinea Pig Immune Sera", *Proceedings of the Society for Experimental Biology and Medicine*, Volume LI, December, 1942, page 313.

P. Levine: "Role of Iso-immunization in Transfusion Accidents in Pregnancy and Erythroblastosis Fetalis", *American Journal of Obstetrics and Gynecology*, Volume XLII, July, 1941, page 165.

P. Levine and E. M. Katzin: "Iso-immunization in Pregnancy and the Varieties of Isoagglutinins Observed", *Proceedings of the Society for Experimental Biology and Medicine*, Volume XLV, 1940, page 343.

P. Levine, E. M. Katzin and L. Burnham: "Isoimmunization in Pregnancy", *The Journal of the American Medical Association*, Volume CXVI, March 1, 1941, page 825.

P. Levine and R. E. Stetson: "An Unusual Case of Intragroup Agglutination", *The Journal of the American Medical Association*, Volume CXIII, July 8, 1939, page 126.

P. Levine, P. Vogel, E. M. Katzin and L. Burnham: "Pathogenesis of Erythroblastosis Fetalis: Statistical Evidence", *Science*, Volume XCIV, October 17, 1941, page 371; "The Role of Iso-immunization in the Pathogenesis of Erythroblastosis Fetalis", *American Journal of Obstetrics and Gynecology*, Volume XLII, December, 1941, page 925.

G. L. Taylor, R. R. Race, A. M. Prior and E. W. Ikin: "Optimal Proportions of Antigen and Antibody in Tests for Rh Antibodies", *British Medical Journal*, November 14, 1942, page 572.

A. S. Wiener: "Hemolytic Reactions following Transfusions of Blood of the Homologous Group, II", *Archives of Pathology*, Volume XXXII, August, 1941, page 227; "Hemolytic Transfusion Reactions, I", *American Journal of Clinical Pathology*, Volume XII, April, 1942, page 189; "Hemolytic Transfusion Reactions, III", *American Journal of Clinical Pathology*, Volume XII, June, 1942, page 302.

A. S. Wiener and H. R. Peters: "Hæmolytic Reactions following Transfusions of Blood of the Homologous Group", *Annals of Internal Medicine*, Volume XIII, June, 1940, page 2306.

SOME NOTES ON FLY CONTROL.

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THE locality of these experiments is in an area of low annual rainfall, which averages about ten inches; variations between 2·5 and 28 inches have been recorded. Through the main camp area, a broad, dry watercourse exists. This is subject to summer flooding, possibly not more than four or five times in a season. The temperature variation is considerable; sun temperatures of over 150° F. occur during the summer, and 13° of frost have been registered in the winter months. The high summer temperature, which lasts from the beginning of October until the end of March, has an important bearing on fly breeding.

The civil population, which is that of a small country town, is accommodated for the most part in well-constructed houses, with a minority who live in shacks under somewhat primitive conditions. The army population, which is eight to ten times that of the civil population, lives almost entirely in tents. The standard of army sanitation is high. The civil sanitation is fair, probably a little better than that of most isolated country towns with little civil organization.

Fly Breeding Places.

Fly breeding places are largely provided from three main sources. Kitchen sullage water from army and civil sources, but largely from the former, provides the main medium. Owing to high summer temperatures, grease traps will not work efficiently, and the greater part of the grease is carried to the soakage beds, which speedily become fly blown, and if unattended, breed enormous numbers of flies. The high surface temperature on the dry pans in midsummer is no deterrent to larval development.

Disposal of Night Soil.

Night soil is disposed of by burial in shallow trenches; it was found to be a prodigious source of fly breeding, until systematic treatment with 1% sodium arsenite solution was adopted and the original burial grounds were disused. The grounds are now situated several times the former distance further away. The scum on the top of an Imhoff tank provides a suitable site for breeding.

Refuse.

The town and camp refuse was formerly disposed of on a hillside, and an attempt at incineration was made. Reorganization of this method, by which the rubbish was piled on stacks of wood (which is abundantly available) and burnt, has been absolutely satisfactory. Other breeding places consist of numerous small areas, mainly in the town, where the carelessness of the population allows rubbish to accumulate. The provision of regular clearances each week has done a great deal to improve this. Animal droppings and offal are responsible for a certain amount of fly breeding. A goat yard, which houses about 100 goats overnight, was found to be breeding enormous numbers of flies to a depth of a foot over the whole area. The larvæ actually constituted the greater part of the infested conglomerate. It has been noted repeatedly that, when shower water, bath water or laundry water is uncontaminated with kitchen sullage, fly breeding does not take place in the soakage areas.

Types of Flies.

The house fly (*Musca domestica*) with all its well-known habits once constituted the majority of all flies, and utilized all the breeding places to which reference has been made.

The bush fly (*Musca vetustissima*) during the last few months has constituted the bulk of flies; but does not come

inside buildings to any extent. Observations of the habits of the flies were made in the first instance by Captain A. R. Woodhill, and he has kindly verified the identification of specimens sent to him from time to time. During his stay in this area, he carried out certain investigations into the distribution of the types of flies. *Musca domestica* was found to be entirely absent from places far from human habitation, whilst *Musca vetustissima* could be found in abundance. In the open or about the town, where breeding places favourable to *Musca domestica* existed, *Musca vetustissima* comprised only one-quarter to one-third of the total number of flies. At an isolated house 26 miles from the town, the house flies were found to be twelve times more common than the bush flies in a brush shelter only twenty yards from the house. Flies inside the officers' mess were all *Musca domestica*. An area about two miles south of the town, not in the direction of the prevailing wind, is separated from the town by a range of very steep hills about 400 feet high. The common house fly was found at the top of this range, apparently having come up from the night soil disposal area below. These findings are given as an indication of the general distribution.

Breeding of the Bush Fly.

Musca vetustissima was first described as breeding in the droppings of cattle (Johnston and Bancroft), and this observation has been repeatedly confirmed in the Northern Territory, Queensland and elsewhere (Campbell, Mackerras, and others). This fly occupies an early stage in the succession of insects which develop in this situation, disappearing when the pad dries out. This may account for our failure to find larvæ in cattle droppings at Alice Springs, although pupal cases similar to those from which the bush flies were bred were found. (The attempt to complete their development failed.) This cannot, however, be the only breeding ground, or even the main one, for bush flies were found in plague numbers by Dampier long before there were any cattle in the country, and they may be found today equally abundantly in areas where there are no stock. An association with decaying spinifex and grasses during the wet season has sometimes been suggested; but no evidence has ever been obtained to support the idea, and I was equally unsuccessful in searches over a wide area. However, these flies breed abundantly in the paunch contents of dead herbivorous animals (Mackerras), and this fact may help a little to explain their abundance, for carrion, small and large, is much more abundant in dry country than is usually imagined. Moreover, Fuller has shown that such carrion may be preserved by desiccation during the dry season, to be renewed as a breeding ground when the rains come.

We failed, like others, to find the natural breeding grounds of *Musca vetustissima*; but the observations described here are, so far as we are aware, the first definite records of its breeding in human fæces.

The army hygiene personnel consisted of three sergeants, who, after some training and explanation of the problems, became keenly interested in fly control measures. They were instructed to keep a constant lookout for breeding places of the bush fly. Ultimately Sergeant Eke discovered numerous pupal cases in a sanitary pan which had been unused for many weeks, the material in it having become desiccated. These pupal cases, which were about half the size of the average case of *Musca domestica*, were nearly the same length, but much narrower, and were more intensely corrugated. It was noted that they were of a lighter colour than usual. In some instances they could have been described as being a dirty whitish-yellow. Portion of these was placed in a tin and covered with sand. A similar portion was placed in another tin and remained uncovered. Both tins were covered with gauze. Within three days, typical examples of *Musca vetustissima* hatched out from the sample covered with sand, and were sent to Captain Woodhill for confirmation of the identification. He also explained the mechanics provided by the sand.

This finding is of considerable importance from an army hygiene point of view, as it shows that the bush fly comes in contact with human fæces and breeds in them. Its presence in latrine pans has been verified repeatedly since. A similar sample of pupæ was recently obtained from the floating sludge on top of an Imhoff tank. At the time of writing, although the same procedure has been adopted as outlined above, maturation has not occurred. It is thought that the colder weather may have influenced this delay.

The discovery of the pupal cases of *Musca vetustissima*, which would appear to have been some weeks old before being aided through the final stage of maturation, suggests the possibility of a resting stage, which may last until favourable conditions, such as moisture or covering with some suitable medium, are present. This may have a bearing on the common observation that large numbers of bush flies appear suddenly after rain. In fact, Lieutenant-Colonel Mackerras informs me that most of these Muscoid flies "lie up" in the prepupal stage, and the dirty white pupæ described above are in all probability prepupæ. He states that this is the normal mechanism of resisting hot, dry and unfavourable conditions, as well as that for wintering in southern cooler climates.

Control Measures.

Owing to the difficulties of disposal of fat from kitchen sullage, the use of deep pits and underground soakage has not been satisfactory. A system of evaporation pans has been employed with success, but these pans provide a satisfactory breeding ground for flies if left untreated. Early investigations showed that large quantities of larvæ were present in all of these pans. Constant turning of the soil, with aeration, did not deter development. Large quantities of larvæ were found as deep as eighteen inches in the sand. Oiling with sump oil was ineffectual. Pupation occurred in the oiled sand or out from its margin. The oil also hampered the disposal of sullage. A quantity of middle oil "67" was tried, and found to be successful as a contact larvicide; but the employment of this in large quantities would inhibit the successful function of the pans, and was not regarded as economical in present circumstances. Quick lime and slaked lime were worked well into the pans after drying; this was also unsuccessful. Borax was tried with partial success, but the method was found to be expensive. The use of sodium arsenite was regarded as unwise, because of the possible contamination of the underground water supply. It has been almost completely successful in the night soil disposal area, where the fly population is now no greater than that of the surrounding country and is composed mainly of bush flies. Where it has been possible to use this substance in the 1% solution, it has effected a substantial reduction in the number of flies.

Chloride of lime was tried, and it was found that, when beds were turned over after having dried and were sprinkled lightly with chloride of lime and then the sullage water was turned onto them, larval development ceased. After a number of experiments had been carried out, it was found that the development of flies in these areas could be inhibited completely, and the success of this operation, which has now been in use for eight months, was the subject of a report which evoked a certain amount of criticism.

Experimental Investigation.

Several experiments were conducted to determine the percentage of chlorine which was necessary as a larvicide, and were set up as follows.

Two four-gallon petrol tins were obtained, and a small quantity of sand about one inch in depth was placed on the bottom. Material containing several hundred active larvæ was then introduced, and each tin was filled with sand to within one and a half inches of the top. In one tin, various percentages of chlorine solution made from bleaching powder were introduced, plain water being added to the other. As a variation, on occasions the control tin was left without water. Maturation of adult flies usually occurred in nine or ten days. The pupal cases were found within the top few inches of the control tin. Pupal cases or mature flies were not found in the

treated tin with a percentage of chlorine as low as 0·5 in two pints of water. Occasionally development did not occur in the control tin, to which water alone had been added. The reason for this is not clear, as observations made on two occasions, after the river had flowed to a depth of two feet over one of the sullage beds for a period of thirty-six hours or more, revealed the presence of living fly larvæ in the sand and under rocks at its margin.

The following experiment is described in order to give an indication of the methods used. It was set up on March 15, 1943.

All tins were kept covered with cheese cloth during the entire experiment. The tins were inspected on March 22.

Number I Tin: Approximately 200 larvæ were placed in the bottom of a kerosene tin and mixed with goat droppings. They were then covered with six inches of damp sand, to the surface of which was added one quart of 1% chlorine solution from chloride of lime.

Number II Tin: The treatment was the same as for the first tin, except that a quart of 0·5% chlorine solution was added to the surface of the damp sand. In each case the chloride of lime had been titrated and found to contain 30% of available chlorine.

Number III Tin: The procedure was the same as for the other two kerosene tins, but no chloride of lime solution was added.

The results were as follows:

Number I Tin: Larvæ were still present in the bottom of the tin in a state of decomposition; no pupæ were found.

Number II Tin: Larvæ were all in the same state as in the previous tin; no pupæ were found.

Number III Tin: About fifteen flies had emerged; these were chloroformed and kept. The tin was again covered with cheese cloth and kept another day. No more flies had bred, so the contents of the tin were examined. Pupæ were found in the sand at varying depths from the surface; these were also kept. Larvæ were also found in the bottom of the tin in the same state of decomposition as in the previous two tins.

Comment.—The findings from this experiment are the same as in all previous ones. The conditions were slightly different, in that the depth of sand above the larvæ in previous experiments had been about twelve inches, but there is no evidence to suggest that this fact influenced the result. It will be noted that a greater amount of sand would have produced a smaller concentration of chlorine. It was not realized at the outset that ants were responsible for destroying flies which had emerged from pupal cases. In earlier experiments the tins were covered with ordinary fly wire, and the ants apparently attacked the flies before they became active after emerging. In the experiment described the ants did not have such easy access. A successful method of preventing this was not devised, as methods available might have interfered with the experiment.

Conclusion.

Actual determination of the minimal solution of chlorine effective as a larvicide has not been made. The use of bleaching powder on the sullage soakage beds has been in operation for eight months, with satisfactory results.

Summary.

Bush flies have been found to breed in human fæces. Chlorine has been found to be an effective fly larvicide in soakage beds for kitchen sullage.

Acknowledgements.

Thanks are due for help from Lieutenant-Colonel I. M. Mackerras and Captain A. R. Woodhill for the information supplied by them and so recorded in the text of this paper.

The assistance with these experiments of Staff Sergeant Farmer, Sergeant Eke and Sergeant Moller is acknowledged.

Acknowledgement is made to Major-General S. R. Burston, Director-General of Medical Services, for permission to publish this paper.

Reports of Cases.

SYPHILITIC PAROXYSMAL HÆMOGLOBINURIA.

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PAROXYSMAL HÆMOGLOBINURIA is a condition characterized by the appearance of hæmoglobin in the urine, the result of paroxysmal intravascular hæmolysis. The varying causes of this hæmolysis permit the recognition of four main clinical entities: (i) hæmoglobinuria from cold (syphilitic paroxysmal hæmoglobinuria), (ii) hæmoglobinuria from exertion (*Marschhæmoglobinurie*), (iii) nocturnal hæmoglobinuria (*marchiafava*—Micheli disease), (iv) paralytic myohæmoglobinuria. It is the hæmoglobinuria from cold which is the commonest and most important type. This is always syphilitic in origin (either congenital or acquired), and its recognition is important because of the relief produced in some instances by antisyphilitic treatment.

The following case is from a Royal Australian Air Force hospital, Sydney.

Clinical Record.

Sergeant B., aged twenty-two years, single, an air observer, had been a university student and athlete. He had no personal history of acquired syphilis and none of the classic clinical features of the congenital type. His father is reported to have amytrophic lateral sclerosis; but his mother and only sibling are well.

This airman said that he had been perfectly well until he reached Canada, during his flying course, in the winter of 1942. There he became very cold one day in his aircraft, and on landing he passed "blood in his urine". Another attack in similar circumstances occurred four days later. At this juncture he was referred back to Australia.

Interrogation revealed that between the ages of five and twelve years he had also passed red urine on six or seven occasions each wintertime, when he became severely cold. He used to shiver, feel numb in the hands and legs, and pass urine dark red in colour. There were no other features, except abdominal cramps, and between the ages of twelve and twenty-one years he had remained perfectly well.

Investigations performed confirmed the clinical diagnosis. Thus, standing in a bucket of iced water for a quarter of an hour produced an attack (Rosenbach test). The Wassermann reaction was strongly positive, and a positive response was also obtained to the Donath-Landsteiner test for the detection of the specific autohæmolysin in the blood. The urine was examined after an attack and found to be dark red in colour and to contain hæmoglobin and methæmoglobin.

Summary.

1. A case of cold paroxysmal hæmoglobinuria is described.

2. It is pointed out that the fundamental cause of the disease is syphilis.

3. It is recommended that antisyphilitic treatment should be administered, for some of the patients at least are relieved.

Acknowledgements.

Acknowledgement is made to Air Vice-Marshal T. E. V. Hurley, Director-General of Medical Services, Royal Australian Air Force, and to Group Captain G. C. Willcocks, for permission to publish this case report.

Bibliography.

L. J. Witts: "The Paroxysmal Hæmoglobinurias", *The Lancet*, Volume II, 1936, page 115.

Reviews.

SIXTH ADDENDUM TO THE BRITISH PHARMACOPŒIA, 1932.

THE "Sixth Addendum to the British Pharmacopœia" assumed official status in the United Kingdom from August 1, 1943.[1]

In addition to many modifications of existing monographs, a number of new ones has been added. The latter include, among others: Acetomenaphthonum, Alcoholia Lanæ, Chloroxylenol, Dithranol, Kaolinum Leve, Menaphthonum, Nicotinamidum, Riboflavina, Stilbœstrol.

One of the most interesting additions is a new emulsifying ointment base, introduced under the somewhat cumbersome name of *Alcoholia Lanæ* (wool alcohols). Though referred to in earlier reports by the more suggestive name of "wool wax", this term was discarded, on the grounds of chemical propriety, in that the base is not a wax but a mixture of cholesterol and other alcohols from wool fat. It is a golden brown brittle solid, becoming plastic on warming and melting at 50° C. From it is prepared *Unguentum Alcoholium Lanæ* (ointment of wool alcohols) having 6% of wool alcohols in a mixture of hard, soft and liquid paraffins. This, with an equal quantity of water, forms an "oil in water" emulsion and constitutes the new *Unguentum Aquosum* (hydrous ointment). The original hydrous ointment of the British Pharmacopœia, 1932, now replaced by the above, is a "water in oil" emulsion of the cold cream type.

Modern usage favours bases of the "oil in water" type both for the greater intimacy of their contact with the skin and for their increased capacity to deliver any contained medicaments. This new hydrous base now replaces the inert bases in the official ointments of boric acid, salicylic acid, tannic acid, hamamelis, ammoniated mercury, oleated mercury, calomel, sulphur, zinc oleate and zinc oxide.

The old zinc ointment, with its paraffin base, is retained as *Unguentum Zinci Oxidi Anhydrosum*.

A welcome addition is *Kaolinum Leve*. Originally kaolin was introduced as a basic ingredient of the official poultice, but, apart from occasional use as a dusting powder, it found little other therapeutic application. For its increasing use internally as an adsorbent and as a successor to the insoluble bismuth salts in the treatment of various types of gastro-intestinal disease, the drug, as originally specified, was quite unsuitable. In catering for such medication, the new *Kaolin Leve* is defined and is required to comply with tests designed to limit the size of its particles. The original product, now *Kaolinum Ponderosum*, is retained solely for the manufacture of the cataplasma.

New vitamin products included are nicotinamide (synonym—nicotinic acid amide), 20 to 100 milligrammes; riboflavina (synonym—lactoflavin), 1 to 10 milligrammes; and the vitamin *K* analogues, acetomenaphthone, 10 to 60 milligrammes, and menaphthone (synonym—menadione), 5 to 10 milligrammes, by intramuscular injection.

With the growing popularity of antiseptics of the chlorinated phenol type, chloroxylenol (parachlormetaxylenol) is included. The standard solution, *Liquor Chloroxylenolis* (synonym—roxenol), is a 5% solution, the chloroxylenol being dissolved with terpineol in alcohol and incorporated in a solution of a sodium ricinoleate soap.

It is for the preparation of this solution that monographs are included to define ricinoleic acid and terpineol.

A somewhat belated addition is the synthetic œstrogen, stilbœstrol (diethylstilbœstrol). The dose is quoted as 0·5 to 2 milligrammes without reference to the equivalents in œstrogenic units.

With further research into the chemistry and pharmacology of ergot alkaloids, the unsatisfactory standard defined in the original monograph is revised. The total alkaloidal content required for *Ergota Præparata* has been raised from 0·1% to 0·2%, and of this, 15% must consist of water soluble alkaloids calculated as ergometrine. The dose, now two and a half to eight grains, is proportionately reduced.

In the absence of a revised monograph on *Extractum Ergotæ Liquidum*, it would appear that the recommendation to use the prepared ergot or the isolated alkaloids rather than the liquid extract still holds.

For infiltration anæsthesia, *Injectio Procainæ et Adrenalinæ Mitis* is formulated, directions being given to prepare this immediately before use by suitable dilution of a standard solution of procaine hydrochloride, adrenaline being added at the time of dilution. The dose for infiltration is up to 300 millilitres (ten and a half fluid ounces), and to distinguish this from the procaine and adrenaline injection of the Fourth Addendum, the latter is now renamed *Injectio Adrenalinæ et Procainæ Fortis*.

In a note on the sterilization of sulphanilamide for application to wounds it is directed that the drug be finely powdered and maintained at a temperature of 150° C. for an hour, or at 140° C. for four hours.

Dithranol, a dihydroxyanthranol, better known under the trade names of "Cignolin", "Anthralan" and "Derobin", is the subject of a new monograph. A triturate in yellow soft paraffin (0·1%) constitutes the official ointment.

The dose of pamaquin is increased from 20 to 40 milligrammes (Addendum IV) to 25 to 50 milligrammes.

As this addendum will be adopted in Australia in the new year, so far as economic conditions will allow, careful note of new monographs and of amendments to old ones, particularly with regard to standards and doses, should be made by prescribers.

[1] "Sixth Addendum to the British Pharmacopœia, 1932", published under the direction of the General Council of Medical Education and Registration of the United Kingdom; 1943. London: Constable and Company Limited. Medium 8vo, pp. 48.

A BOOK ON SURGERY.

THE sixth edition of "A Short Practice of Surgery", by Bailey and Love, has recently been issued.[1] This is the most popular of student text-books on surgery. In reviewing previous editions we have always given high praise to this work. This praise was grounded on the excellent set-out, with clear divisions into paragraphs, the use of different types, the use of excellent photographs, and in fact of every artificial device that could be used to help memory. In this respect, Bailey and Love have set a new standard in text-books.

It is, therefore, with great regret that, after much consideration, we feel that we must review this book adversely. The basis of this criticism is that the book is a summary, and that a summary is not of great use to anybody except the person who made it. The fact of the matter is that it is far easier to learn from a full explanation than it is from a summary. An example of this may be taken from the section in Bailey and Love on "Chronic Interstitial Mastitis". Under the heading of "Treatment" is the following sentence:

"In early cases, without cyst formation, and where the possibility of carcinoma does not arise, strapping the breast and giving iodine by mouth, or hormone therapy, often relieves symptoms, and in a certain number of cases the nodules disappear."

It happens that behind each of these methods of treatment there is an interesting story, and the full explanation of each treatment does much to explain the whole pathology of breast disease. Such explanation is easily remembered because of this interest. A summary has to be learnt by heart. Instances of such unfortunate compression are common throughout the book.

We do not advocate that anything should be added to the book, but simply that it should be expanded to the original from which the summary was taken. If this were done by such masters of exposition as Bailey and Love, the result would be one of the best text-books on surgery ever written.

A GUIDE TO ANATOMY.

THE fifth edition of "A Guide to Anatomy", by E. D. Ewart, certificated teacher of massage and medical gymnastics, is a book for students of medical gymnastics, massage and medical electricity.[2] The fact that this book should have reached its fifth edition, and has celebrated its twenty-first birthday, as stated in the foreword, is proof of its popularity.

This work is really a compendium of anatomy, and the greater part of it deals, as one would expect, with muscles and joints. The work is of handy size, the type is clear and it is liberally illustrated with useful plates and diagrams. The student will do well to remember, however, that he should try to make the dry bones live, and he will profit most in the use of this book by studying it in conjunction with his study of the anatomy of the living.

[1] "A Short Practice of Surgery", by H. Bailey, F.R.C.S. (England), and R. J. McNeill Love, M.S., F.R.C.S. (England); Sixth Edition; 1943. London: H. K. Lewis and Company Limited. 8¾" × 5¾", pp. 1042, with 922 illustrations, of which 132 are coloured. Price: 36s. net.

[2] "A Guide to Anatomy, for Students of Medical Gymnastics, Massage and Medical Electricity, etc.", by E. D. Ewart; Fifth Edition; 1943. London: H. K. Lewis and Company, Limited. 8½" × 5", pp. 322, with many illustrations. Price: 17s. 6d.

The Medical Journal of Australia

SATURDAY, DECEMBER 18, 1943.

All articles submitted for publication in this journal should be typed with double or treble spacing. Carbon copies should not be sent. Authors are requested to avoid the use of abbreviations and not to underline either words or phrases.

References to articles and books should be carefully checked. In a reference the following information should be given without abbreviation: Initials of author, surname of author, full title of article, name of journal, volume, full date (month, day and year), number of the first page of the article. If a reference is made to an abstract of a paper, the name of the original journal, together with that of the journal in which the abstract has appeared, should be given with full date in each instance.

Authors who are not accustomed to preparing drawings or photographic prints for reproduction are invited to seek the advice of the Editor.

AUSTRALIA AND THE FOOD PROBLEM AT HOME AND ABROAD.

Most Australians are very concerned at the muddle which seems to be inseparable from the production and distribution of food in this country. On one day they have to pay abnormally high prices for an article of diet; the next day they hear that thousands of the same article have been dug into the ground because it would not pay to gather them and send them to market; on the following day the same kind of article may be well nigh unobtainable. Vegetables when they are plentiful reach the market in enormous quantities and a large surplus is destroyed, while much of the product has been gathered and has became unusable owing to lack of transport. One day an article of diet is to be rationed; the next day a minister of the Crown declares that rationing is not necessary because there is no shortage of the article in question. Milk becomes scarce and distribution is left more or less to the caprice of the milk carter, invalids and children having in some places great difficulty in obtaining adequate supplies. But facts of this kind are common knowledge and experience and there is no need to enumerate them further. That people are exasperated at the muddle is not surprising, and there is some justification for irritation when improper buying and selling go on and everyone has not a chance to buy his proper share of certain foodstuffs. If the matter was one that concerned only the immediate hunger of today or tomorrow it would not matter so much. The food problem is, as most people know or ought to know, a matter of such gravity that the immediate safety of the nation and its future efficiency are inseparable from it. Further than this, Australia has certain commitments, certain responsibilities to other parts of the British Empire and to other nations, which must be accepted if Australians are in the future to be able to hold up their heads with honour in the commonwealth of nations.

In a recent account in these pages of a book by G. H. Bourne on starvation in Europe readers were reminded of Australia's post-war obligations in the matter of food, and reference was also made to the United Nations Conference on Food and Agriculture at which these obligations were made clear. An account of the general conclusions reached at this conference is now available,[1] and it is at once apparent that the decisions have a bearing on the external and the domestic arrangements of all the participating countries. The conference, which was held at Hot Springs, Virginia, from May 18 to June 3, 1943, was attended by official representatives from forty-four governments and authorities; Australia was one of the forty-four. As its "final act" the conference adopted thirty-three declarations, resolutions and recommendations. The published account of the meeting deals with a few of the more important resolutions. The first action was that the governments represented were asked to confirm the principle of mutual responsibility and coordinated action in order to achieve freedom from want in all lands. If this is done and an attempt is made to achieve the objective, adverse economic conditions of all kinds will have to be attacked so that poverty is not allowed to stand between the individual and his procurement of a fair share of any food that is available. Then all barriers to the availability, the supply, of food must be removed, and this in many places will call for increased production. If the world is regarded as a single unit, a considerable expansion in food production will be necessary, for "there has never been enough food for the health of all people". If the governments accepted an obligation to their own peoples and to one another, they would each then be pledged:

(i) To raise the levels of nutrition and standards of living of its own people;

(ii) To improve the efficiency of agricultural production and distribution;

(iii) To cooperate, so far as may be possible, with other nations for the achievement of these ends;

(iv) To undertake to submit periodically to the other participants, through the permanent organization, reports on the action taken and the progress achieved towards these ends.

Australia as a unit among those who adopted these resolutions has accepted heavy responsibilities, and it must be noted that the responsibilities are domestic as well as external—it is in truth much more than a matter of today's or tomorrow's hunger. It is thus clear that as things are in the world today, a heavy and unavoidable strain will be put on Australia's food supply. A statement of this kind will make readers think at once of food for export. But on the domestic side the nutrition of the Australian people has to be considered, and in view of the confusion and contradictions evident on every hand, must be regarded as in jeopardy.

Any attempt to solve the problem must be directed at both production and distribution. In regard to production, the chief care will be to see that food sufficient for all needs is produced. It is difficult to see how in a properly run economy over-production could occur, for any food that was not immediately needed would be stored for future use after such treatment as might be necessary for its preservation. If food is produced and is not, or cannot, be used, the producer cannot be blamed if he tries to avoid a repetition of the catastrophe in a later season

[1] *International Labour Review*, August, 1943.

by disposing of part of his stock or by allowing his ground to lie fallow. Food must be produced as close as possible to the place where it will be consumed, where it will be treated by any necessary manufacturing process, or from which it will be sent when packed to other States or other countries. The provision of transport to centres of population or to distributing centres is a matter for the authority charged with distribution. The authority concerned with production will have to deal with manpower problems, the supply of farming implements and, we should imagine, occasionally also with financial needs of producers. But over and above this there is also need to consider the quality of the food to be produced, and here advice and assistance may be called for from veterinary and agricultural scientists, and also from the human physiologist and biochemist. The distribution of food presents all kinds of difficulties. Not the least of these is that of transport by rail, and here we are up against the coal shortage and all the complex and regrettable facets of the problem—a subject with which we cannot attempt to deal. The trouble about the production of distribution of food is that many bodies have a hand in it and have certain powers that they can exercise, but there is no central overriding and coordinating authority. The Rationing Commission exercises its necessary and useful function and we have numerous boards concerned with eggs, milk, apples and pears and so on. Taking priority over all these bodies, are the armed forces, who can step in and take anything they want to take and apparently in any quantity that they desire. Everyone will agree that the armed forces should have all that they need in the way of food, and also that persons engaged in laborious work should have larger quantities of certain food than the average civilian, but people are not satisfied that the requisitions by military and semi-military authorities are always wisely made and that more is not taken than is actually needed. It is the special concern of the medical profession to see that adequate provision within the limits of availability is made for the average citizen and specially for invalids, for nursing mothers and for children. The medical profession is by no means content that the best is being done that can be done. Officialdom will, of course, reply that provision is made for the supply of special rations to meet special circumstances. This is all very well, but officials should change places with some of the unfortunates whose need compels them to seek these rations; the experience would be salutary. The plight of an invalid or of a convalescent recovering from a severe illness who tries in Sydney to secure the cream ration to which he or she is entitled, on certification by a doctor, is something like the fate of a shuttle-cock in the game played with a battledore. This is, of course, only a small item in the distribution of foodstuff generally, but it does show the need for searching investigation into the present state of affairs. The control of food throughout Australia must be so organized that every man, woman and child, sick or well, shall be able to obtain, at reasonable cost and without too much of the battledore and shuttle-cock business, food of sufficient caloric value and containing a fair share of available accessory food factors.

One of the measures that will be suggested is the establishment of a "national loaf"—a bread made of a higher extraction flour so that it will contain more of the vitamins of the *B* series. It is doubtful whether such a step as this (it has been done in England) is necessary in Australia, and, what is more important, whether it could be done without serious risk of interference with the available quantity and with the quality of such important foods as milk, butter, bacon and eggs. It is not generally known that the vitamin B_1 content of Australian wheat is higher than that of either English or American wheat. Moreover, as a result of the methods used in this country for the manufacture of flour, the vitamin B_1 content of Australian flour is on the average much higher than that of English and American flour. The Nutrition Committee of the National Health and Medical Research Council found in 1941 that the average content for Australian flour was 235 to 270 international units per pound and that the average figures for British and American flour were respectively 138 to 159 international units and 77 international units. There is therefore in this country not the same reason for the reinforcement of flour with vitamin B_1 as there is in England. Another fact to be remembered is that the cow, the pig and the hen are to a certain extent "artificial" animals. If more is to be taken from the "pollard stream" during the manufacture of flour and added to the loaf for human consumption, the foods provided by these animals will be lessened in value—what we have on the swings we cannot also have on the roundabouts. The remedy for the whole situation, and the only remedy, is obvious; it has been suggested in other quarters, but the suggestion has fallen on deaf political ears. Until a Ministry of Food is created in Australia with complete control of the production and distribution of food for all persons, military and non-military, there will be no end to the present unsatisfactory conditions. In England it was recognized quite early in the present war that food difficulties would arise and that the enemy would try to prevent food supplies from reaching the United Kingdom. Few people in Australia, richly endowed as she is, thought that a food problem would arise in this country. The problem has been one of gradual, almost at times imperceptible, growth; it will be more difficult now than it would have been early in the piece to create smoothly running food machinery, covering Australia's domestic needs and her external commitments. Australia needs a Lord Woolton, and the sooner he is found, either among those who sit at Parliament House, Canberra, or among those who have not this privilege, the sooner will our food problem be solved.

Current Comment.

SURGICAL SHOCK.

DURING the past two decades the problem of elucidating the causes of shock has not been solved despite the magnitude of the research on this problem. The present state of affairs may be likened to a jigsaw puzzle in which many of the pieces are missing; each piece of information gained may be expected to help in the final solution of this problem. Of those who have contributed to the solution of this problem and who have supplied many of the "pieces" we already possess, A. Blalock is especially deserving of praise, and all articles by this author are worthy of study. Recently Blalock[1] has studied the effects of lowering the temperature of an injured extremity to

[1] *Archives of Surgery*, February, 1943.

which a tourniquet has been applied. He found that in laboratory animals the application of a tourniquet to a severely injured extremity for a five-hour period resulted in a higher mortality rate than when no tourniquet was used. However, if the traumatized extremity was cooled with ice, the ill effects of shutting off the blood supply to the injured part were lessened. These findings are probably explained by the local ischæmia *plus* the trauma resulting in more deleterious changes than are caused by the trauma alone. In addition, when the part is cooled the slowing of the metabolic processes lessens the importance of the ischæmia. In practice a tourniquet should be used only when unavoidable and should be released at intervals. These experiments confirm the undesirability of a tourniquet in the treatment of shocked patients. Also, if a tourniquet is essential for more than a few minutes it would seem advisable to cool the traumatized limb.

When a patient is admitted to hospital in a shocked condition, an erudite discussion of shock, its causes and treatment, are not required by the patient. The practical aspects of the subject are then more important, and he will benefit most if antishock measures are readily available and are applied. In most well-equipped hospitals these antishock measures are at hand; but only too often is time lost in performing the pathological tests which are supplementary to a careful history and physical examination in determining the details of treatment to be employed. This delay is most easily obviated by the maintenance of a "shock cart" as suggested by J. Scudder.[1] The "shock cart" should contain sufficient apparatus to determine the hæmoglobin value, the total protein of the plasma, the specific gravity of the plasma, the hæmatocrit reading on the venous blood, and the specific gravity of the peripheral blood (it is in the capillaries that hæmoconcentration which foretells of the approaching fall of blood pressure first appears). Some of these tests may be thought superfluous, but when dealing with such a condition as surgical shock in which the patient's life is often at stake and which is imperfectly understood, nothing but good can come from their use. Scudder points out the value of a changing specific gravity or hæmatocrit reading. In shock, except that due to hæmorrhage, a decreasing hæmatocrit reading indicates that the blood volume is being restored, whereas, on the other hand, if hæmoconcentration is increasing in spite of treatment, either the lesion is overwhelming or else the supportive therapy is insufficient or incorrect. It is all very well in some cases to deprecate pathological tests and to boost clinical examination; but in surgical shock reliance on clinical examination alone often acts to the detriment of the patient, for it fails to detect slight changes in his condition, and therefore the failure to use ancillary methods of examination must be regarded as due to ignorance or to laziness. If the apparatus is readily available, the few minutes necessary for these tests would not be a cause for delay in treatment, the excuse that is usually offered for their neglect.

As regards anæsthesia for patients who have been shocked, each method has its own advocates, most of whom consider they are right. In an attempt to confirm his clinical impressions of the value of nitrous oxide over ether for these patients, C. S. Dafoe[2] induced shock in rabbits by intestinal stripping, and then four hours later the animals were again anæsthetized. His results suggest that the administration of ether to shocked animals increased the mortality rate more than did either nitrous oxide or cyclopropane. There is, however, some question as to the parallelism of shock in man and animals, and these results cannot be considered as conclusive for man.

As R. C. Adams and J. S. Lundy[3] point out, the evaluation of antishock measures by a consideration of a falling mortality rate among patients who have suffered from surgical shock must include an appreciation of improvements in operative procedures, of the evolution of less toxic anæsthetic agents and of improved methods for their administration, of improved methods for the administration of oxygen, of special methods such as tracheobronchial aspiration after operation, and of the increased skill and versatility of anæsthetists. When these factors are considered it is seen that progress in the treatment of surgical shock has been slow, but nevertheless sure, and there is every reason to hope that such progress will continue.

[1] *Surgery, Gynecology and Obstetrics*, March, 1943.
[2] *Current Researches in Anesthesia and Analgesia*, March-April, 1942.
[3] *Surgery, Gynecology and Obstetrics*, May, 1942.

TRAUMATIC HEART DISEASE.

IN the issue for December 21, 1940, of THE MEDICAL JOURNAL OF AUSTRALIA a leading article was devoted to a discussion of contusion of the heart caused by direct trauma. It was shown that when a patient suffers from a severe contusion of the heart an area of muscle is put out of commission in much the same way as the area of heart wall in coronary occlusion is thrown out of action by deprivation of its blood supply. There is, of course, the fundamental difference that in contusion the affected area is full of extravasated blood and in coronary occlusion the area is ischæmic. Both occlusion and contusion may occur in the same individual, and after a certain length of time the scars of both conditions may be indistinguishable. In a recent study of 250 cases of non-penetrating chest injury, H. Arenberg makes some interesting observations.[1] He records the histories of 28 patients who sustained cardiac damage as a result of injury. All but three of these patients were in the age group when coronary disease and arterial hypertension are most prevalent. As Arenberg remarks, it is clear that a previously diseased heart is more vulnerable to trauma than a normal heart and the damage caused is likely to be greater. He found that the severity of chest trauma and the chances of cardiac damage did not necessarily correspond. There were in his series many cases of severe chest injury with bilateral fracture of as many as eleven and thirteen ribs, but with no cardiac involvement. On the other hand, several cases of severe cardiac contusion with resulting permanent conduction defect were met with in persons in whom no rib fracture or injury to the sternum was discovered. "It is apparently the degree of elasticity of the chest wall and the type of blow which determine the chances of cardiac injury by anteroposterior compression." When the ribs are fractured the force of the impact or blow is broken or diminished and the damage to the substratum is not so great. From the practical point of view one of the most important points about this study is a statement made in regard to thirty-six persons in a group described as comprising those who were more seriously injured. Many of these persons were treated in hospital for a considerable time following the accident, but except in three or four cases no serious cardiac study was made while they were in hospital or soon after the accident. In only two instances were electrocardiographic examinations made prior to the commencement of Arenberg's study. Nearly all the patients received physiotherapy for some considerable time. On the one hand this does, as Arenberg states, bear out the contention of Bright and Beck that the vast majority of cases of cardiac damage in non-penetrating chest trauma are not recognized. The relationship between elasticity of the chest wall and cardiac contusion is not known to exist. The other side of the picture is that if the cardiac damage had been detected or even suspected, treatment might have prevented or minimized permanent cardiac disability. Arenberg thinks that treatment might have prevented the development of chronicity or even the occurrence of death from the direct or indirect effects of the injury. To determine whether a cardiac disability is the result of trauma may be extremely difficult, and careful cardiac examination of every patient suffering from chest injury should be of value in an effort to make a decision. Such an examination should be made without the patient's knowledge that his heart is under suspicion.

[1] *Annals of Internal Medicine*, August, 1943.

Abstracts from Medical Literature.

PATHOLOGY.

Myoepithelial Proliferations in the Human Breast.

FROM the word "myoepithelial" it is apparent, according to Joseph F. Kuzma (*The American Journal of Pathology*, May, 1943), that the original intention was to convey the impression that cells so called are muscle epithelial cells. This had its conception in the fact that morphologically they resemble smooth muscle cells, but are more intimately associated with the usual epithelium of the glandular or functioning part of the organ; that is, by position these cells should be epithelial in nature, but by shape and structure they are indistinguishable from smooth muscle cells. Consideration of their embryology leads to the conclusion that they are epithelial in origin and remain akin by position to the epithelial elements of the breast gland. Explanations of the morphology and of the function of myoepithelial cells are not readily apparent. No definite function has been attributed to them. Much speculation has taken account of their morphological similarity to smooth muscle and thus assigned to them the possible functions of support to the ducts or of aid in the emptying of the glands. It might be more advantageous to consider these cells in the light of their epithelial ancestry and to attribute to them some function associated with epithelial tissue. It is quite evident that they do not have a visible secretion product like the epithelial cells of the breast. Furthermore, rarely do they come in contact with the secretion within the ducts. One may postulate, therefore, that perhaps these myoepithelial cells act as receptors rather than as excretors. Perhaps they have an affinity for internal secretions and later deliver them to the epithelial cells. At present, however, it is more important to recognize myoepithelial proliferations than to ascribe to them a specific function. The myoepithelial cells of the mammary gland possess the faculty of proliferation, either alone or in conjunction with the usual epithelium, especially in breasts showing *mastopathia cystica* and fibroadenomatosis. They have the power of survival and proliferation in senile involution and fibrosis of the breast. In so far as is now known, proliferations of the myoepithelial cells are benign as long as they retain the characteristics of their epithelial ancestry, but may become malignant when forming derivatives of the type usually ascribed to mesoderm. Borderline or suspicious breast lesions should be carefully studied for the presence of myoepithelial elements. If the proliferations are found to be myoepithelial, such lesions are benign and should be distinguished as such.

Tumours of Sebaceous Glands.

As a first instalment of a series of papers which are going to deal with "tumours of the dermal appendages", Shields Warren and Wesley N. Warvi (*The American Journal of Pathology*, May, 1943) present an account of tumours of the sebaceous glands. In the benign group there is, in the opinion of the authors, no clear histological distinction between the so-called adenoma of the sebaceous glands and the hyperplastic and hypertrophic glands. Rhinophyma is a diffuse form of excessive local hypertrophy and hyperplasia of the sebaceous glands. Circumscribed lesions have been divided according to their clinical characteristics into those occurring in old age, those appearing at birth and at puberty, and those associated with other cutaneous and visceral abnormalities forming the syndrome of Pringle's disease. The senile sebaceous adenoma hardly ever occurs before the fifth decade. Multiple nodules develop on the exposed parts of the face, especially the forehead. The circumscribed lesion in the young patient is usually considered to be congenital and consists of a plaque-like lesion formed of numerous papules. The term *adenoma sebaceum* is usually associated with the name of Pringle, who gave particular attention to its histology. Pringle's disease has come to mean a syndrome of multiple congenital abnormalities in which enlargement of the sebaceous glands is constant and changes in other organs occur, but are variable. The sebaceous growths are disposed symmetrically on the face and are very small lobular tumours. They appear early in life and are often familial. The authors record a case of a twenty-six years old woman in which hyperplasia and hypertrophy of sebaceous glands were associated with neurofibromata of the skin, congenital cystic disease of the lungs with pneumothorax on the left, tuberous sclerosis associated with cystic softening of the left lenticular nucleus, ovarian leiomyomata, mesenchymal rests of the kidneys and retroperitoneal tissues, and recent hæmorrhages into renal calyces. In summing up their discussion the authors state that true sebaceous adenomata are rare, that most of the so-called adenomata are instances of hypertrophy or hyperplasia of the sebaceous glands. With regard to the malignant lesions, they are of the opinion that sebaceous gland carcinoma is a pathological entity, although it is often confused with basal cell or epidermoid carcinoma. To include a tumour in this group it must show at least in parts some resemblance to sebaceous glands. The prognosis is quite good if adequate excision is done at an early stage. On the other hand, recurrence and metastases may take place and some of the tumours are resistant to irradiation.

Extramedullary Plasma Cell Tumours.

A REVIEW by C. Alexander Hellwig (*Archives of Pathology*, July, 1943) shows that 127 cases of extramedullary plasma cell tumours have been reported since 1905, that is, approximately three cases annually. In 65 cases the tumour originated in the air passages; in 35 of these it was localized, and in 30 it was definitely invasive. The proportion of men to women sufferers was 5 to 1 for the benign lesions and 13 to 1 for the malignant lesions. The average age of the patients with localized, benign tumours was 57 years; that of the patients with malignant tumours was 47 years. The duration of the disease was longer than three years in 30 cases, five years in 18 and ten years in 10. At the time of reporting, 23 patients were dead, 4 patients had survived the last treatment for ten years, and 9 patients had lived for three years. After bone lesions became manifest, the duration of survival was one year and seven months. After the tumour had locally invaded bones or had spread to distant organs, no method of treatment prevented an early fatal outcome. In 50 cases the plasma cell tumour had been reported as originating in the conjunctiva. The sex ratio was 1 to 1, and the average age was relatively low, namely, 37·7 years. In this location the plasma cell tumour has very indistinct neoplastic properties. Only two cases are known in which recurrence took place. Only in four instances did the plasma cell tumour originate in a lymph node. One of the patients survived after operation for a period of three years. While the plasma cell tumour may originate in almost any part of the body, it has actually been found outside of air passages, conjunctiva and lymph nodes in only thirteen cases. The conception of the plasma cell as being a differentiated lymphocyte places the extramedullary plasma cell tumour in the disease entity of lymphoma. No correlation between cytological appearance and clinical behaviour has been shown. The extramedullary plasma cell tumour, in spite of typical cell structure, may range from an entirely benign growth to a high-grade malignant growth.

Conjunctival Exanthem in Spotted Typhus.

A. P. AVTSIN (*Archives of Pathology*, August, 1943) holds that the diagnosis of spotted typhus fever in a cadaver offers many difficulties, particularly when the characteristic eruption is mild or has disappeared. Other gross signs of typhus have little diagnostic significance because they are not characteristic and are to be seen in other infectious diseases. At the same time, a pathological diagnosis of typhus may have an important epidemiological significance. It is possible, however, to observe in the majority of typhus cadavers a conjunctival eruption which has a definite diagnostic significance. Characteristic of the sign are (*a*) multiple red spots and dots or points and (*b*) particularly characteristic, oblong and oval spots. The points and spots present various forms and are dissimilar in regard to intensity of bright red or yellow colour. These changes are seen on the conjunctiva of the lower lid, the upper lid and occasionally the sclera. The upper lid should be turned out completely for examination. Gross examination of this sign suggested that the spots are the result of petechial hæmorrhages of varying intensity, analogous to the extravasation not infrequently observed in the gastric mucosa in spotted typhus. However, microscopic studies revealed that these changes represent specific typhus lesions of the arteries and capillaries. Pronounced thrombovasculitis is observed with great frequency. The lumina of the arterioles and capillaries and occasionally of the veins are occupied by red hyaline or mixed thrombi. Organized small fibrinous thrombi are encountered frequently. Segments of blood vessels are commonly the seat of fibrinoid necrosis affecting all of the layers of the wall. Vascular endothelium is found to be in

a state of proliferation and pronounced swelling. The adventitial cells are increased. Lymphoid and plasmocytic infiltrations surround many vessels. In addition to the changes of a destructive thrombotic character there are compact nodular formations occasionally surrounding a vessel in a stage of stasis. Small hæmorrhages are occasionally noted. The process described develops immediately beneath the epithelial layer of the conjunctiva. The epithelial layer itself presents moderate degenerative changes in the form of vacuolation, pyknosis and desquamation of single cells. In more than 600 cadavers conjunctival spots were encountered with fair constancy in only the following infectious diseases: typhus, septic endocarditis, particularly *endocarditis lenta*, and meningococcal sepsis. Exceptionally red spots were noted on the conjunctivæ in pneumococcal sepsis complicated by purulent meningitis. Other infectious diseases only rarely present similar changes. The conjunctival changes in the aforementioned diseases present certain more or less characteristic differences. In meningococcal sepsis the spots are few, large and deep red. The well-known conjunctival hæmorrhages of septic endocarditis are usually larger and brighter and not infrequently contain a greyish centre. The finding of the characteristic changes in the conjunctivæ of cadavers justifies the suspicion of typhus in clinically obscure cases.

MORPHOLOGY.

Connective Tissue Sheaths of Cutaneous Nerves.

P. GLEES (*Journal of Anatomy*, January, 1943) has conducted degeneration experiments on cutaneous nerves to see whether the sheath elements are preserved in the degenerated cutaneous nerve plexus. Spielmeyer had shown, in 1922, that the general pattern of a nerve is not lost even after a long period of degeneration, and more recent investigations emphasize that the original neurilemmal tube ("Schwann tube") remains intact and able to lead regenerating fibres back towards the periphery. The present investigation now shows that there is a similar preservation of sheath elements that provide a pathway by which regenerating fibres may be led back all the way to the original sense organs. Perineurium, endoneurium and hypertrophic Schwann cells together preserve the old pattern of innervation for the new ingrowing fibres. These new fibres grow down inside the old endoneural tubes and are thus forced to repeat the former mode of ramification to a given area of skin.

Variations in Ossification of the Hand.

J. F. BRAILSFORD (*Journal of Anatomy*, January, 1943) states that while ossification of the bones of the hand in the normal individual proceeds with the regularity recorded in most anatomical text-books, certain variations occur. These concern for the most part the development of the so-called pseudoepiphyses and the true supernumerary epiphyses. In this investigation the author records and discusses the variations found in 1,000 apparently normal infants of ages ranging up to three years and thirty twins varying in age from three to eleven years, and contrasts them with those found in over 200 cases in which developmental irregularities and pathological conditions were know to exist, as well as published radiographs of cases of arachnodactyly and the unusual dystrophies published by Ellis and others.

Synovial Membrane and the Origin of Synovial Mucin.

D. V. DAVIES (*Journal of Anatomy*, January, 1943) reviews the several theories which have been advanced to replace the origin of synovial mucin, and discusses the bearing on the problem of the recently discovered enzyme, hyaluronidase, which is capable of hydrolysing this mucin. By the methods used in this investigation, no cells containing mucin or pre-secretion granules of this substance were seen, and it is suggested that the rate of mucin production may be so slow that it is impossible to detect it with any ease by histological methods. The author expresses the opinion that our present knowledge of the synovial membrane is biologically as inadequate as our chemical knowledge of the mucins, but suggests a course along which further work on this controversial problem might proceed.

Hair Direction in Mammals.

E. C. COLIN (*Journal of Morphology*, March, 1943) records a study of the origin and early development of hair follicles in guinea-pigs. The direction or slope of the follicle becomes established very soon after the primordium appears. The slope is probably the result of unequal growth on the opposite sides of the primordium. The polarity of the follicle normally persists and determines the direction of the future hair, although the angle between the follicle and the surface of the skin may be modified by local environmental factors such as tension and pressure or by differential growth of the epidermis. In rough guinea-pigs the follicles in rough areas take abnormal directions from the beginning; their direction correlates with that of hairs in rough areas. In the normal smooth-coated guinea-pig the follicles point in general away from regions that appear to be growing rapidly at the time of origin of the primordia. The formed hairs point in the opposite direction. It is probable that these active regions (posterior end, distal ends of limbs and ears) are the "highs" of physiological gradients which may serve as organizers of polarity in the follicles by stimulating unequal growth on the opposite sides of the primordia. Under this hypothesis the hereditary irregularities in hair direction (whorls, featherings, crests *et cetera*) are caused by genetic factors which locally alter the primitive metabolic relationships and set up new gradients in particular regions.

Experimental Studies on the Pancreas.

A. J. RAMSAY *et alii* (*The Anatomical Record*, May, 1943) state that by the use of unanæsthetized dogs with partially exteriorized pancreas, it has been shown that the presence of peptone in the intestine causes characteristic changes in the acinar cells of the pancreas. During peptone stimulation the acinar cells become depleted of zymogen granules and secretion accumulates in the ducts. Acinar cells in the vicinity of the islets retain their granules, some forming halos. The changes observed are similar to those which have been described as occurring during stimulation of the vagus nerves and differ from those which are said to result from the presence of hydrochloric acid in the intestine (hormonal stimulation). Characteristic changes did not occur during peptone stimulation in animals whose vagus nerves were divided. The results of these experiments are in accord with the hypothesis that peptone stimulates the pancreas through a nervous mechanism which is dependent for its normal irritability on the integrity of the vagus nerves.

The Formation of the Plantar Arch of the Foot.

H. M. VANN (*The Anatomical Record*, March, 1943) states that observations made in the course of routine and special dissections have indicated that the mode of formation of the plantar arch differs from that described in most text-books of anatomy. These mostly describe the plantar arterial arch as being formed by the lateral plantar artery, but the author states that in a majority of cases, above 81%, the plantar arch was found to be formed by the deep plantar branch of the *dorsalis pedis* artery. In only 15% was the arterial arch formed by the lateral plantar artery.

Nerve Cells in the Neurohypophysis.

W. M. SHANKLIN (*Journal of Anatomy*, April, 1943) has identified typical nerve cells in all parts of the neurohypophysis of the dog. In this study, the entire hypophyses and adjacent part of the hypothalamus of ten adult dogs were examined. Counts are given on the hypophyses of three dogs, and the number of cells varies from 0·1 to 4·7 cells per section in different parts of the neurohypophysis. The shape and size of the cells show considerable variation, but they are on the average fully as large as the majority of cells in the hypothalamus.

The Blood Supply of Nerves.

W. E. ADAMS (*Journal of Anatomy*, April, 1943) gives an account of the blood supply of the sciatic nerve in the thigh of a rabbit and contrasts it with that of man. Contrary to Okada's contention that degeneration invariably results from ligation of the inferior gluteal artery, no degeneration or other obvious histological change occurred in eight rabbits in which this operation was repeated. An extension of the experiment to include the other sources of supply of the sciatic nerve in the thigh was carried out in twelve animals. In ten of these there was either no degeneration at all, or if degeneration was present it was extremely limited and insignificant. In the other two cases, in both of which the nerve had also been mobilized, extensive degeneration with concomitant clinical signs resulted. It is uncertain, however, whether these two results are to be attributed to the slight manipulation of the nerve or to some variation in its intrinsic vascular pattern in these cases. The significance of the results is discussed.

Public Health.

CONFERENCE AT CANBERRA.

THE following statement on the decisions reached at the recent conference between the Parliamentary Joint Committee on Social Security, representatives of the medical profession, the Defence Service Medical Directors, and a representative of the National Health and Medical Research Council has been issued by Mr. H. C. Barnard, chairman of the first-named body and chairman of this conference.

The health conference between the Social Security Committee, the medical profession and Defence Services Medical Directors, at Canberra, has agreed to the following proposals for a plan of positive health, including:

(*a*) Public health and preventive measures.

(*b*) Tuberculosis. An active campaign against tuberculosis including (i) special rate pensions and allowances at approximately the basic wage to the tuberculous and their dependants; (ii) extended and improved facilities of chest clinics for early diagnosis, preliminary survey by skin testing and miniature radiography, and consideration of compulsory notifiability; (iii) adequate follow up of contacts and examination; (iv) improved hospital and sanatoria facilities and technique for treatment; (v) greater development of after care and rehabilitation.

(*c*) Mental hygiene. A Commonwealth-wide survey of all aspects of mental deficiency and mental illness, uniform legislation in respect of mental sickness throughout Australia, and provision of wards at all large hospitals for the treatment of nervous disorders.

(*d*) Venereal disease. Improved and extended clinic facilities and accommodation for "in-patient" treatment, an educational campaign, sporting, recreational and social facilities for leisure hours, and rehabilitation and treatment of the promiscuous girl.

(*e*) A uniform system of registration for medical practitioners throughout Australia, under a Commonwealth act, administered by local authorities in each State.

(*f*) Uniform legislation and administration throughout Australia in respect of food, drugs and poisons, and auxiliary services, including (*a*) improved ambulance services and extension of Flying Doctor services in remote areas, and (*b*) improved laboratory and X-ray facilities at hospitals—particularly in rural areas—and clinics, and training and provision of medical staff and technicians for such services, as aids to diagnosis and treatment.

While endorsing generally the proposals for a standard course of training in nursing, standard conditions of employment and accommodation, and preliminary training schools in nursing, it was agreed that the committee hear further evidence in this regard from the representative nursing associations.

The following statement was made by Sir Henry Newland, President of the Federal Council of the British Medical Association in Australia.

I want to state most emphatically that the sole object of the representatives of the medical profession at this conference is to devise a comprehensive health service in the best interests of the Australian citizen.

This has been the primary object of the profession in all the many meetings which have been held throughout Australia to deal with the question. There is abundant evidence of this purpose in the evidence given before the Parliamentary Joint Committee. A casual reader of the sixth report of the committee would, however, have no inkling of this, but would form the opinion that a satisfactory scheme for the medical care of the public had been devised, but its implementation prevented by the selfish attitude of the doctors. Though not prepared to offer an opinion on the broad financial aspects of the scheme, we claim that the profession is at least as capable as any group of laymen of saying what medical service is best for the individual.

We feel that the present system of medical practice, whilst having certain admitted shortcomings, does provide a comprehensive service at all hours and at convenient locations to the public. It ensures that in general the patient is brought into close and intimate relation with his medical attendant. In the schemes suggested for a salaried service, with scattered clinics, this relationship is destroyed, and great inconvenience is liable to be entailed in regard to transport, and in many instances there will be difficulties to the patient in leaving the home unattended. It must be remembered also that disease knows no time-table, and that under a salaried scheme there will be many occasions on which a doctor is needed and a visit to a clinic impossible. Such an impersonal scheme is a poor substitute for the present system under which there is a close personal relationship between patient and doctor.

This is the first official contact of the British Medical Association with the Commonwealth Government. The British Medical Association is very interested in the Governments attempt to improve the services available to the sick throughout the entire nation.

In the past the Government has never found any money for curative medicine. Now that it proposes to spend as much as £9,000,000 annually, it is to be congratulated upon its new intentions! After all, the main question is one of finance.

The British Medical Association represents officially the great majority of doctors practising curative medicine. It therefore offers its assistance so that this money may be spent in such a way that the sick will get the full benefit. The British Medical Association wishes to work in conjunction with the Government so that their combined efforts may achieve this object.

I suggest the discussion of the financial principles under which this money will be spent is the most important matter for consideration at the meeting.

Financial principles suggested as follows:

1. Doubtless the Government agrees with the profession that a special medical fund, raised by additional tax according to the income tax curve, is the fairest method of raising the money. In this way a medical pool can be formed. From such a pool the well are helping to pay for the sick during any given period.

2. The wishes of the Government or its officials and the interests of the medical profession are of little importance by comparison with the feelings of the sick for whom the money is being made available. The patients' interests must be paramount.

3. There is nothing the matter with the practice of curative medicine as it is carried out today, except the rising cost thereof. The increased cost is the result of special methods of diagnosis, hospitalization and treatment. This cost of necessity must continue to rise; therefore, anything which, while retaining the best service, helps to reduce the cost of the patient overcomes the main difficulty.

4. The British Medical Association does not agree that money raised for this purpose and handed to doctors in the form of a salaried medical service is necessary in the best interests of the sick. [*Sic.*]

5. It would be better to work on the lines suggested by Dr. Charles Byrne, whereby attempt is made to reduce the rising cost of medical treatment and hospital accommodation by meeting the major portion of the patient's expenses out of the medical pool. Anything received for nothing is not appreciated; for example, free medical service resembles a dole. But the medical pool protects both the patient's purse and personality. Where the patient still has to pay even a minor portion of his costs, as suggested above, he retains his individuality, he has freedom of action, he chooses the doctor he trusts and dismisses the doctor he dislikes. No third party can intervene. He employs his doctor, thereby expecting first consideration. (When the patient is the customer he must always be right.) The doctor is not responsible to some other employer who might obtain his first consideration instead of the patient doing so. These points sum up the best features of private enterprise, where the payment of the doctor is largely by results, while the patient's liberty is preserved.

6. Payment of medical expenses should be governed by a reasonable schedule of fees. (This is essential in estimating costs of service, and particularly in community hospitals, in assessing the patient's financial category.)

7. While the British Medical Association agrees that the same medical service should be available to all, it also insists that the quality must not suffer. The foregoing indicate that the best quality service can be made available to all, whether poor, intermediate or wealthy, by subsidy from a governmental pool.

Post scriptum: Note the harping on money; the "great new factor". Of course, there must be salaries or capitation fees in special places, especially where population is thin and transport distances are great. The above applies only to cities and large towns.

The conference decided to refer to a medical planning committee of the conference the general principles agreed upon and the remaining matters upon which no decision had been reached, for consideration and report back to the conference at a later stage.

Correspondence.

THE NERVOUS SOLDIER.

SIR: May we be permitted to reply to remarks by that distinguished historian, Dr. A. G. Butler, in your issue of November 27, 1943.

On the strength of a paragraph which he quotes *in extenso* he infers the existence of a defeatist attitude and an inability to assess correctly the psychology of the normal soldier. Such a criticism would be justifiable if the reader of the "Nervous Soldier" confined his attention to those paragraphs which deal with malingering. Unpalatable as may be this reference to that "pleasure pain principle" which plays a fundamental part in all human behaviour, it is regrettably true in spite of the wishful thinkers in the high ranks of the Returned Soldiers' League and elsewhere.

Our profound sympathy goes out to those numerous soldiers and their families who, encouraged to seek for "normal" rewards in pension and privilege, will eventually find that the haven of economic security has been purchased at the price of a crippling nervous disorder. It is unfortunately true that the normal soldier is as unaware of his own psychology as of his gastric peristalsis. Did he know the vagaries of his own subconscious, he would be grateful for this whiff of realistic sanity in the fog of wishful thinking idealism.

May we suggest that our book "The Nervous Soldier" be judged as a whole. We concur entirely with Dr. Butler that the medical officer must have the wisdom of the serpent. It did not occur to us that a reader might think we intended him to have the attitude of a sleuth. Surely this view is incompatible with that expressed in our opening paragraph:

> Ideals are all important. The greater the ideal or incentive the greater the likelihood of success. It is the key which unlocks many riddles. It explains why the frail often achieve the apparently impossible and why the physically and mentally well-equipped end their careers in failure.
>
> We are actors today in one of the great moments of history. We are called to help free a large proportion of civilization from the enslaving serfdom of German Nazism and Japanese imperialism. We realize, as never before, the value of personal and national liberty. This liberty, which has been brutally snatched from Czechs, Danes, Norwegians, Poles, Dutch and Greeks, has assumed a new significance for us in the face of danger. Hitherto we took it overmuch for granted. Democracy alone provides the way of life and the form of government under which it can live and flourish. So democracy must prevail or freedom will vanish from the earth. This is an incentive, this is a motive that should have the power to light the torch of unflagging enthusiasm in us. And today we of the Anzac zone have another motive—perhaps the most primitive of all—that of defending our homes from destruction and our women and children from slaughter.
>
> We would seem to need that spirit of virile realism that belonged to our forefathers when with their liberty and homes in jeopardy they fought—and won.

Or in this advice proffered to the medical officer:

> *Speak straight.* Do not mince matters. This is a life and death struggle. Freedom versus slavery. Truth against falsehood. Liberty against tyranny. Australia expects every man to do his duty. A sick man is a drag on the great community effort. Some will be impressed by the zeal of fighting for a new and better order of society. Others react to plea for the safety of women and children. Still others see religion, the call of God as the great incentive, and many have such a loyalty for their fighting unit, that they would rather die than desert their friends.
>
> Your task is to find the particular loyalty, discuss, use, emphasize and strengthen it, until it takes a part in keeping the patient on the track to health.

We refer him to our finale:

> There will be quiet days when it will profit the medical officer to daily with his patients, extracting the story of their lives so that they appear not as men in uniform, but as human souls striving from infancy through the trials of youth and the perils of adolescence to a near stability endangered by the cataclysm of war. It is your privilege to be able to disentangle the threads and to restore stability.
>
> Undoubtedly psychological studies entail the use of patience. This is, however, not all sacrifice. The sympathetic medical officer gains not merely an understanding of the psychological viewpoint, but an inexhaustible fund of useful general knowledge. And with victory, when there is a return to civil life, the fruits will go to those who have benefited by experience. The psychiatrist believes that there is no practitioner of medicine, whether in general or specialized practice, who will not benefit through an appreciation of the psychological approach.

It will be seen that we begin and end with the emphasis on ideals and sympathy. They are, as Dr. Butler rightly infers, essential to our understanding of the problem.

If we have had to stress the need for study of malingering, let Dr. Butler blame the author of life as it is rather than the humble psychiatrist whose duty is to chronicle fact without reference to its palatability.

Yours, etc.,

JOHN BOSTOCK.
EVAN JONES.

December 3, 1943.

VACCINATION AGAINST PERTUSSIS.

SIR: It is possible that the Brisbane City Council will undertake the free vaccination of children against pertussis. If this is so it will become my duty to decide the dosage and intervals between the injections that are to be given.

It has been pointed out to me that to avoid confusion, especially in the public mind, and so save endless explanations by all concerned, it would be desirable to fix upon a standard course of injections to be used as widely as possible. The ideal, of course, would be for similar courses of injections to be used throughout the Commonwealth.

The course of injections which I propose to adopt, which seems to be a fair average of the recommendations of the latest literature on the subject and which meets the local approval, is a series of three injections given at weekly intervals, consisting of 1·0 cubic centimetre, 1·5 cubic centimetres and 2·0 cubic centimetres respectively, of a vaccine containing 20,000,000,000 Phase I *Hæmophilus pertussis* per cubic centimetre.

I should like to know the opinion of interested practitioners and local authorities on my proposal, especially as to the practicability of arriving at some standard technique to be used as widely as possible.

Yours, etc.,

L. A. McLEAN,
Medical Officer of Health.

Town Hall,
Brisbane,
December 10, 1943.

Naval, Military and Air Force.

APPOINTMENTS.

THE undermentioned appointments, changes *et cetera* have been promulgated in the *Commonwealth of Australia Gazette*, Number 248 and 253, of November 25 and December 2, 1943.

PERMANENT NAVAL FORCES OF THE COMMONWEALTH (SEA-GOING FORCES).

Fixing Rates of Pay.—Surgeon Lieutenant Clive Laurence Statham to be paid the rates of pay and allowances prescribed in the Naval Financial Regulations for Surgeon Lieutenant-Commander (on promotion) whilst acting in that rank, dated 14th September, 1943.

ROYAL AUSTRALIAN AIR FORCE.

Citizen Air Force: Medical Branch.

Flight Lieutenant J. H. Newton (263890) is transferred from the Reserve with effect from 20th September, 1943.

Squadron Leader J. B. G. Gibson (277428), who was appointed for part-time consultant duties, is appointed for full-time duty with effect from 29th September, 1943.

John Tyrer, M.B., B.S. (267564), is appointed to a commission on probation with the rank of Flight Lieutenant with effect from 30th August, 1943.

The following Flight Lieutenants are granted the acting rank of Squadron Leader whilst occupying Squadron Leader posts with effect from the dates indicated: E. D. E. E. O'Brien (257096), 16th September, 1943, A. K. McIntyre (262064), 1st October, 1943.

Flight Lieutenant J. H. P. Abbott (267131) is transferred from the Medical Branch Reserve to the Active List with effect from 4th October, 1943.

Flight Lieutenant P. E. Breheny (251272) is granted the acting rank of Squadron Leader whilst occupying a Squadron Leader post with effect from 28th May, 1943.

Reserve: Medical Branch.

The following are appointed to commissions on probation with the rank of Flight Lieutenant with effect from the dates indicated: Charles Francis Bellemore, M.B., B.S. (267567), Rowland Anthony Godfrey Smith, M.B., B.S. (257579), Leslie Leonard Greenberg, M.B., B.S. (267569), Broughton Vernon Mutton, M.B., B.S. (267570), Keith Harold Sisson, M.B., B.S. (257576), Bertram Stansall Skerman, M.B., B.S. (277459), Jeffery Robert Tripp, M.B., B.S. (267568), 13th September, 1943; Thomas Early, M.B., B.S. (297427), Thomas Herbert Gaven, M.B., B.S. (277462), Frederick John Dexter Giblin, M.B., B.S. (267571), Douglas Hemming-Jones, M.B., B.S. (277460), Grantley Sheridan Stable, M.B., B.S. (277461), Ian Mitchell Tulloch, M.B., B.S. (297426), 28th September, 1943.—(Ex. Min. No. 311—Approved 24th November, 1943.)

The following officers are transferred from the Active List with effect from the dates indicated: Squadron Leader H. M. Webber (261893), 22nd October, 1943, Flight Lieutenant E. R. Edwards (252062), 7th October, 1943.—(Ex. Min. No. 316—Approved 24th November, 1943.)

The following are appointed to commissions on probation with the rank of Flight Lieutenant with the effect from the dates indicated: Lincoln Hill Ski Robbins, M.B., B.S. (277463) (13th September, 1943), John Edward Carroll, M.B., B.S. (267573), Albert John Gumley, M.B., B.S. (287424), Bernhard Nils Ostberg, M.B., B.S. (257582) (19th October, 1943).—(Ex. Min. No. 325—Approved 1st December, 1943.)

Obituary.

LESLIE COWLISHAW.

WE regret to announce the death of Dr. Leslie Cowlishaw, which occurred on December 11, 1943, at Killara, New South Wales.

Medical Appointments.

Pursuant to the provisions of the *Metropolitan Infectious Diseases Hospital Act*, 1922-1935, Dr. Frank Humphrey Makin and Dr. Herbert Henry Ernest Russell have been elected members of the Metropolitan Infectious Diseases Hospital Board, Adelaide, the former having been nominated by the local Board of Health for the Municipality of the city of Adelaide, and the latter by the South Australian Branch of the British Medical Association.

Nominations and Elections.

THE undermentioned has applied for election as a member of the New South Wales Branch of the British Medical Association:

Williams, Joan Keatley, M.B., B.S., 1943 (Univ. Sydney), Royal North Shore Hospital, St. Leonards.

The undermentioned have been elected as members of the New South Wales Branch of the British Medical Association as from January 1, 1944:

Alexander, Thirza Alice, M.B., B.S., 1943 (Univ. Sydney), Base Hospital, Wagga Wagga.

Brown, Frederick Alan, M.B., 1942 (Univ. Sydney), Resident Medical Officer, State Hospital, Liverpool.

Harris, Hubert Roy, M.B., B.S., 1943 (Univ. Sydney), District Hospital, Grafton.

Hercus, John Macky, M.B., B.Sc., 1942 (Univ. Sydney), Bank Chambers, 17, Bolton Street, Newcastle.

Kesteven, Hereward Leighton, junior, M.B., B.S., 1943 (Univ. Sydney), Base Hospital, Lismore.

Malouf, Joseph Michael, M.B., B.S., 1941 (Univ. Sydney), 15, Blenheim Street, Randwick.

Malouf, Phozzie Anthony, M.B., B.S., 1943 (Univ. Sydney), 465, Church Street, Parramatta.

Miller, George Joseph, M.B., B.S., 1941 (Univ. Sydney), 20, Napoleon Street, Mascot.

McKell, James, M.B., B.S., 1942 (Univ. Sydney), Royal North Shore Hospital, St. Leonards.

Grattan-Smith, Maureen, M.B., B.S., 1943 (Univ. Sydney), Sydney Hospital, Sydney.

Wiles, Ronald Booth, M.B., B.S., 1942 (Univ. Sydney), 4, Blaxland Road, Bellevue Hill.

Books Received.

"A New Conception of Keratoconjunctivitis Sicca (Keratitis Filiformis in Hypofunction of the Lachrymal Glands)", by Henrik Sjögren, with a foreword and appendix by J. Bruce Hamilton; 1943. Sydney: Australasian Medical Publishing Company, Limited. 9¾" × 6", pp. 152, with illustrations. Price: 25s.

"Medical Advice from a Backblock Hospital", by G. M. Smith, M.B., Ch.B., F.R.C.S.E., with articles and notes by other authors; Second (cheap) Edition; 1943. New Zealand: Progressive Publishing Society, Wellington. 8¾" × 5½", pp. 96. Price: 3s.

Diary for the Month.

DEC. 21.—New South Wales Branch, B.M.A.: Medical Politics Committee.

Medical Appointments: Important Notice.

MEDICAL PRACTITIONERS are requested not to apply for any appointment mentioned below without having first communicated with the Honorary Secretary of the Branch concerned, or with the Medical Secretary of the British Medical Association, Tavistock Square, London, W.C.1.

New South Wales Branch (Honorary Secretary, 135, Macquarie Street, Sydney): Australian Natives' Association; Ashfield and District United Friendly Societies' Dispensary; Balmain United Friendly Societies' Dispensary; Leichhardt and Petersham United Friendly Societies' Dispensary; Manchester Unity Medical and Dispensing Institute, Oxford Street, Sydney; North Sydney Friendly Societies' Dispensary Limited; People's Prudential Assurance Company Limited; Phœnix Mutual Provident Society.

Victorian Branch (Honorary Secretary, Medical Society Hall, East Melbourne): Associated Medical Services Limited; all Institutes or Medical Dispensaries; Australian Prudential Association, Proprietary, Limited; Federated Mutual Medical Benefit Society; Mutual National Provident Club; National Provident Association; Hospital or other appointments outside Victoria.

Queensland Branch (Honorary Secretary, B.M.A. House, 225, Wickham Terrace, Brisbane, B.17): Brisbane Associated Friendly Societies' Medical Institute; Bundaberg Medical Institute. Members accepting LODGE appointments and those desiring to accept appointments to any COUNTRY HOSPITAL or position outside Australia are advised, in their own interests, to submit a copy of their Agreement to the Council before signing.

South Australian Branch (Honorary Secretary, 178, North Terrace, Adelaide): All Lodge appointments in South Australia; all Contract Practice appointments in South Australia.

Western Australian Branch (Honorary Secretary, 205, Saint George's Terrace, Perth): Wiluna Hospital; all Contract Practice appointments in Western Australia.

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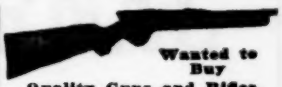

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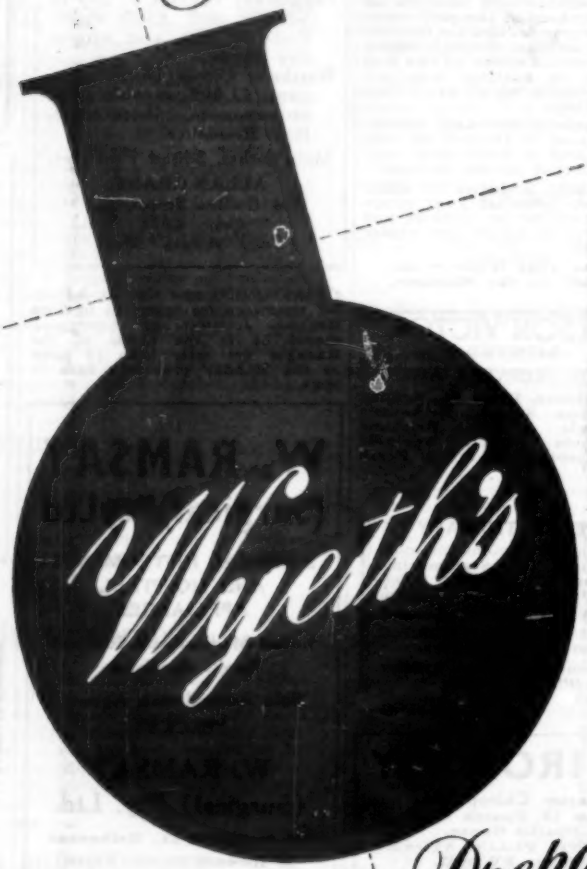

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